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VOL. XII

APRIL, 1929

No. 4

MINIMAL PULMONARY TUBERCULOSIS—ITS DETECTION

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ALTHOUGH we sometimes speak of tuberculosis control as one of the great achievements in medicine, there is still much to be achieved. Not so long ago physicians and others were of the opinion that the eradication of tuberculosis was largely a matter of scouring the country for the minimal (incipient) cases, and building institutions to cure them. Many such institutions were built, but troubles loomed, when their doors were thrown open, that had never been dreamed of. There appeared a deluge of advanced cases and a rarity of minimal cases. What was wrong?

1. *Significance of pleurisy with effusion and pulmonary hemorrhage was not generally understood.* Many cases of pleurisy with effusion were diagnosed idiopathic pleurisy, treated by limiting motion of chest wall and administering narcotics and sent back to work without a word of warning. Many cases of pulmonary hemorrhage had the "bleeding point" sought in a tonsil and were advised to return to work the next day. In other words, pleurisy with effusion not accompanying or following pneumonia, or other acute nontuberculous conditions, and pulmonary hemorrhage were not generally recognized as often being first manifestations of tuberculosis. The result was that those cases who were so unfortunate as to have no other early manifestations came for re-examination months or even years later only to be told that they were suffering from advanced tuberculosis. I have recently seen a man of thirty-one years who had pleurisy with effusion in 1915. Apparently there was no other definite manifestation of the disease until 1926, when he developed pain in a knee joint. This condition gradually grew worse, and tu-

berculosis was found to be present in the joint. An examination of the chest revealed advanced tuberculosis of both lungs with cavity formation. His prognosis now is extremely bad.

A good example of pulmonary hemorrhage as a first manifestation is the case of a high school girl who in November, 1927, expectorated a mouthful of blood following cough precipitated by violent laughing. She returned to school the next day and graduated the following June. No other manifestations of tuberculosis appeared until September, 1928, when she had a profuse pulmonary hemorrhage. She was then found to have advanced pulmonary tuberculosis.

It will not suffice for only the medical and closely allied professions to know the significance of pleurisy and pulmonary hemorrhage. The public must also know. Every child should become as familiar with these facts as with the multiplication tables. In the past many such cases have not even been called to the attention of the physician, until advanced disease was present.

2. *Reflex symptoms were not generally understood as early manifestations.* By reflex symptoms we usually mean those that occur along the vagus nerve either below or above the lungs. Perhaps the two of which patients most frequently complain are those referable to the gastro-intestinal tract and the larynx. Either of them may be the first evidence of pulmonary disease. For such cases, in the past, various forms of treatment, from diet and the simplest medication to major surgery, have been applied only to find later that there was no disease in the digestive system, but the unsuspected pulmonary lesions had become very extensive. For reflex

hoarseness of voice and tickling in the larynx vast numbers of tonsils have been removed and many months lost in applying, to the inside of the larynx, various kinds of drugs. The trouble was not in the larynx, but when detected was advanced disease in the lungs. Reflex symptoms from the lungs exist just as truly as from other parts of the body. When satisfactory evidence to account for these symptoms can not be found in the gastro-intestinal tract or the larynx, the chest should be carefully examined without delay. At that time the lung lesion may be minimal.

3. *Significance of the insidious onset was often overlooked.* All too often we were guided by the general appearance of those who sought examinations, overlooking the fact that a chronic tuberculosis may be progressive for many months and even years in the lungs of persons who appear to be in perfect health. Such patients have slight or no symptoms, and may have been working at their usual occupations in a one hundred per cent way. If slight symptoms caused the patient to report for examination they were not given sufficient consideration. The patient may even have been told that he looked too well to have anything wrong with his lungs, and went away feeling somewhat embarrassed because he had been oversolicitous about his health, or he had a false sense of security and did not report again until months or years later when extensive disease was present.

We must not overlook the fact that a great many people with insidious onset ignored any symptoms they may have had, and were not examined until the disease was advanced. This happens every year even with trained health workers, and probably has been the chief cause of so much advanced tuberculosis. Rathbun examined six hundred apparently healthy officers and men on board a ship returning from France. He found cases of tuberculosis among them. He later examined a large group of high school students and found unmistakable tuberculosis even in some of the most active athletes.

To prevent tuberculosis from becoming advanced in this group of patients is a difficult task. Many have refused and others will continue to refuse to accept the diagnosis and treatment until their disease is so advanced that they are extremely ill. We must never lose an opportunity to examine most carefully the chests of all per-

sons who report for examination. For those who have no symptoms or those who ignore slight symptoms the only satisfactory method would be to make chest examinations universal. This in our present stage of health development is impossible.

4. *Massive disease was generally believed to be of long standing.* When cases of extensive tuberculosis were found someone was blamed. Either the patient was reprimanded for not having reported sooner for the first examination or the physician was criticized for not having detected the disease on previous examinations. Many believed that all cases of pulmonary tuberculosis begin with a very small lesion which slowly develops. This is true of the insidious onset type, but not all cases have that kind of onset. Careful study of cases has proved beyond doubt that a considerable number of tuberculous patients have massive involvement at the beginning of their disease. Lungs in which careful examination reveals no evidence of disease may be found extremely involved with tuberculosis a few weeks later. I know of no solution for this problem. Such cases will continue to come to us with advanced disease.

5. *Physical examination was thought to be infallible.* The patient who had no abnormal physical signs usually was told that his chest was clear, and that no further search for disease was necessary at that time, although he may have then been suffering from any stage of the disease, even the advanced. It was well known that central pneumonia might exist without causing definite physical signs, but very few thought of tuberculosis in the same way. It has been only twenty years since the cause for the difference in physical signs elicited over the two apices in the normal chest was explained by Fetterolf. Before that time I have no doubt that many physicians were misled by the signs over the right apex and diagnosed tuberculosis when it did not exist. It is a quite well established fact that when a pulmonary lesion lies four centimeters or more from the lung surface, examination by percussion and auscultation usually affords us no help. This is one reason so many people passed life insurance examinations and were granted standard policies, or in periodic health examinations were told that the lungs were in excellent condition, when in reality they had definite pulmonary lesions. Many lesions

located near the chest wall were detected by physical examination, but even some of such lesions were missed. Every chest examiner knows how chagrined he has been on more than one occasion to see definite evidence of tuberculosis on *x-ray* films or to find tubercle bacilli in the sputum of a patient whom he found negative to physical examination the preceding day. This is said to have happened even to Trudeau. Therefore, when we depended upon physical examination alone, we failed to detect many cases of tuberculosis until their disease had become advanced. We are fortunate now in having had developed aids to the physical examination which render chest studies far more valuable than they were in the past, both to the patient and the physician. These aids, however, must be properly used; if not, they may even be misleading.

6. *Diagnosis was not made until tubercle bacilli were found.* After Koch described tubercle bacilli and taught that they are always present in tuberculous lesions, there developed among physicians a reluctance to diagnose tuberculosis until the bacilli could be demonstrated. This attitude might have been expected, but it was a terrible mistake—one which has not been completely rectified even to this day. Even in the presence of history of exposure, physical signs, and other evidence of disease, diagnoses of tuberculosis were withheld, patients were told that they had bronchitis, etc., because bacilli could not be demonstrated. What a price the human family paid! Minimal cases were allowed to become advanced and moderately advanced cases became far advanced. Persons whose disease had not broken down continued untreated until bacilli were found and were being disseminated to others. Can we criticize these physicians of three and four decades ago for this action? We can not, because they were acting in the light of the best knowledge available. Later studies showed, however, that tubercle bacilli can be demonstrated in sputum of only about one in three of the minimal cases of tuberculosis. That means that if we postpone diagnosis until bacilli are found approximately two-thirds of our patients have developed advanced disease. Further studies showed that inability to demonstrate the presence of tubercle bacilli on a single or even several examinations does not affirm the absence of tuberculosis. Parts of a specimen collected today may contain no bacilli; other parts may

have an abundance of them. An entire specimen collected today may contain no demonstrable tubercle bacilli while a specimen collected tomorrow or next week may be teeming with them. Even negative animal inoculation is not always conclusive evidence of the absence of tuberculosis.

7. *The use of the x-ray was too limited.* It was about thirteen years after Koch reported his work on the demonstration of the tubercle bacillus that Roentgen presented the *x-ray*. Following this was a period of years required for development of *x-ray* equipment and technic. In fact, such development is still in progress. Therefore, it is only within recent years that the *x-ray* has been of much help in diagnosis of minimal tuberculosis. The fluoroscopic examination is helpful in many phases of chest work, but can not be depended upon in the diagnosis of early tuberculosis. The *x-ray* film should be made a routine part of every chest examination. In order to be of real value in diagnosis proper technic must be used. Over-exposure of a film may completely "burn out" minimal lesions, while under-exposure may lead to misinterpretation. The physician who is not equipped with the most modern *x-ray* appliances and whose technician is not well trained should never make *x-ray* pictures of the chest with the thought of diagnosing minimal tuberculosis. He not only wastes the patient's money and his own time in a good many cases, but his diagnosis may cost the patient a long period of invalidism or even life. *X-ray* film should, in my opinion, always be interpreted by a physician well trained in interpretations. I know of only one or two exceptions to this statement in this country which seem to me to be justified. Within the last six weeks, a woman came to me carrying an *x-ray* picture, and told the history of her husband's illness. It appeared that he had had colds, and a cough had persisted longer than was usual with him. She had taken him to an *x-ray* laboratory operated by a layman, who interpreted the *x-ray* films. A glance at the films of this man's chest was sufficient to convince a physician that the technic had been carried out by an amateur, and the verbose typewritten report was even worse. There was a calcification, about the size of a quarter, in one lung hilum upon which great emphasis was placed. Tuberculosis was read into practically every lobe of the patient's lungs.

A cavity was described in the base of one lung, which in reality was a misinterpretation of calcification in the costal cartilages. This "expert" informed the wife that her husband must become a strict bed patient and as soon as possible be sent to a sanatorium. When she was asked about her husband's temperature, she told me that it was terribly high, some days registering as much as 99.2. Examination of this patient at a later date revealed no evidence of clinical tuberculosis, but I have had a hectic time convincing the family of the worthlessness of the first *x*-ray.

Well made and properly interpreted *x*-ray films of the chest are second only to the finding of tubercle bacilli in the diagnosis of tuberculosis. In cases where the physical examination fails, the *x*-ray may show unmistakable evidence of tuberculous lesions. This is not a rare occurrence. In fact, many minimal lesions are detected today, which without the *x*-ray examination would develop into advanced disease before a diagnosis would be made by other methods. In tuberculosis work this is a very significant fact, for so often lesions may be detected before they have broken down the tissues and before tubercle bacilli are being discharged from the body. In fact, this is the way Rathbun, Opie, McPhedran and others have found cases of pulmonary tuberculosis among high school girls and boys, who apparently were enjoying excellent health. We must not get the impression that the *x*-ray is infallible; even with the best technic and the best interpretation, errors occur. But, we are safe in concluding that no examination of the chest is complete that does not include well made and carefully interpreted *x*-ray films.

8. *The prevailing type of tuberculosis in childhood was not generally recognized.* Between the ages of two or three years and ten or twelve years, it has been known for some time that the mortality from tuberculosis is very low. However, the incidence of tuberculous infection was known to increase. Physicians very carefully examined suspected children's chests for pulmonary tuberculosis. In most cases they elicited no evidence of disease in the lungs of these children, and all too often told the parents that they did not have tuberculosis. Here again we must not criticize them for they were working in the light of the best knowledge of that time. But with the advent of the *x*-ray and the intelligent use of the cutaneous tuberculin test it

was shown that tuberculosis is quite common during this age period. However, it usually is not of the pulmonary type. It involves the lymph nodes, which in the chest are located so remotely from the surface that ordinarily physical examination is of no avail. Chadwick of Massachusetts, Rathbun of New York, and others have found in large numbers of children examined that between three and four per cent are suffering from tuberculosis of the lymph nodes. The group of nodes that have been found most commonly involved is the hilum group. Observations of children over a period of years led Rathbun to state that he believes one in eight of such children develop the adult and destructive form of pulmonary tuberculosis during the teen-age period. Thus it is obvious that without detection of the lymph node type of tuberculosis and no treatment of the cases many later developed advanced tuberculosis.

It would seem a hopeless task to *x*-ray all the girls and boys of this age period of the country. In fact, this is not necessary, since we have come to know that tuberculous infection is by no means universal even among adults, and averages well under fifty per cent among children of the age period. It would suffice to apply cutaneous tuberculin tests to all children and proceed with a complete examination including *x*-ray films only of those children who react positively to the tuberculin test. In some rural communities, this number, as shown by Slater of Worthington Minnesota, would not amount to more than eleven per cent of the children. In the larger cities in Chautauqua County in New York, Rathbun found only forty-one per cent reacting positively to tuberculin. McCain of North Carolina found less than thirty per cent of the children with evidence of infection. Therefore, our problem among children is not as large as we had formerly believed it to be, but its proper solution is one secret of preventing advanced tuberculosis in later life.

These are some of the chief reasons why a deluge of tuberculous patients with advanced disease appeared at the doors of institutions. The National Tuberculosis Association informs us that still eighty-four per cent of the patients who report for treatment are suffering from advanced disease. Among the remaining sixteen per cent there are a good many cases who are proved to

have non-tuberculous conditions. The Early Diagnosis Campaign of the National Tuberculosis Association this month is doing much to educate the people regarding tuberculosis in general and early diagnosis in particular. Many are reporting to physicians who will not be satisfied with

anything but very complete examinations. If they do not get them their confidence in the medical profession will be diminished. If they do get them their confidence will be increased and many cases of minimal tuberculosis will be detected.

CLINICAL EXPERIENCES WITH ECLAMPSIA*

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THE purpose of this paper is to give a brief discussion of some of the phases of eclampsia as they concern a physician in general practice and to present a few cases representing different types of cases.

The most common finding in the toxemias occurring late in pregnancy is hypertension, but obviously not all cases of hypertension in pregnancy are eclamptic. Cases of hypertension in pregnancy may be roughly divided into three groups:

1. A relatively benign type occurring early in pregnancy characterized by gradual rise in arterial tension but with little evidence of serious intoxication. These are the so-called nephroses of pregnancy.

2. A late malignant type occurring with sudden unheralded onset, rapid rise in arterial tension and evidence of marked intoxication, quickly becoming true eclampsia, with hepatic as well as renal and vascular damage.

3. Hypertension in pregnancy with pre-existing vascular and usually renal disease. In this group are included those with definite complications such as toxic goiter, cardiac disease, acute infections and the like.

In considering eclampsia, I think it is very essential that we first consider prenatal care. F. W. Rice in reviewing a series of 222 cases of eclampsia found that only 7 per cent had had adequate prenatal care. I feel that if we want to reduce the incidence of eclampsia we must do more than we have done in educating the laity to the need of prenatal care. It has been my experience that about 50 per cent of my obstetrical cases do not consult me until less than a month before confinement and about 20 per cent of these I do not see at all before confinement. For some reason, we are not impressing any large percentage of the people with the need of prenatal care. Nor are these people entirely of the uneducated class. As an example, about three years ago, one of our leading citizens, a college graduate and a very capable man, casually informed me that he was going to call me in

about three weeks to attend his wife in confinement. I told him to bring his wife to the office for an examination. He said he did not think she needed any examination, and, furthermore, he was sure she would not consent to come in. I then told him of the need of prenatal examinations, and also told him that if she would not come in I was going out to see her. They finally consented to let me do that.

As medical men, we are inclined to blame the public for not consulting us sooner, but I believe some of the blame rests with us. Not long ago, I had occasion to talk with a woman who had recently successfully weathered a severe type of eclampsia (convulsions about every one-half hour for twenty-four hours). I asked her why she had not consulted a doctor before she was confined. She said she had gone to one but that he told her there was no need of an examination or urinalysis so long as she was feeling all right. He told her to go home and not worry.

In my practice, I explain to my patients the need of frequent blood pressure readings and urinalysis and insist that they report at certain set dates. Then, when I find any evidences of beginning toxemia I tell the patient and her husband very candidly the dangers that lie ahead. I do this for two reasons: (1) to protect myself; and (2) because I have found by very sad experience that if you do not tell them the dangers they are apt to disregard your instructions. Occasionally, if I do not think that they comprehend the gravity of the situation, I cite cases that they knew have lost their lives in eclampsia. This never fails to get them to coöperate.

As to the management of cases that some weeks before term begin to have slight subjective symptoms with increased arterial tension, with or without albuminuria, it depends upon the response you get to treatment. I restrict their protein diet, prescribe Epsom salts by mouth, stop their work and watch them for a few days. If their blood pressure comes down and their symptoms clear up, I try to carry them along until term. If they do not respond to this treatment, I put them to bed, allow only milk and push the salts to the point of five or six watery

*Presented before the Southern Minnesota Medical Association, Rochester, Minnesota, October 2 and 3, 1928.

stools a day. It has been my experience that in practically every case that is discovered early this will reduce the blood pressure, decrease the albumin and carry them through.

Occasionally, however, you will find a case with marked evidence of toxemia. The cardinal symptoms are headache, dizziness, visual disturbance, decreased urine output, edema and epigastric pain. Usually the blood pressure will be over 160. These are the cases that have not been having adequate prenatal care. The question then arises as to whether or not we should empty the uterus at once, and, if we should, how? In answering this question, a great deal depends on the type of patients you are dealing with and also the degree of toxemia present. However, the trend of practice is swinging to conservative treatment. This is also true in cases of actual eclampsia. In my own practice, I have never emptied the uterus except when active eclampsia existed.

There are various methods in vogue for the control of toxemia of these cases. Probably the one in most popular use is magnesium sulphate either intravenously or intramuscularly. Lazard† says that he is of the belief that magnesium sulphate intravenously does not exert any deleterious action on the blood nor produce any pathological changes in the liver but on the contrary, in active eclampsia, by relief of toxemia, has a beneficial effect on the blood. It is used in a 10 per cent solution, the usual dose being 20 c.c. Besides relaxing the voluntary muscles and controlling the convulsions, it has a marked diuretic effect, thus eliminating the toxins. Dorsett prefers to give it intramuscularly. He uses 15 c.c. of a 25 per cent solution and repeats it every hour if necessary.

Another drug that seems to be worth trying is ammonium chloride. It is given largely for its diuretic effect. It is given by mouth and its use is generally followed by prompt diuresis, disappearance of edema, lowered blood pressure and general improvement. My experience has been that it is apt to irritate the stomach, and is best given in capsule form.

Concerning the management of cases of active eclampsia, I find that more and more men are becoming convinced of the value of conservative treatment. Williams‡ reports a series of 275

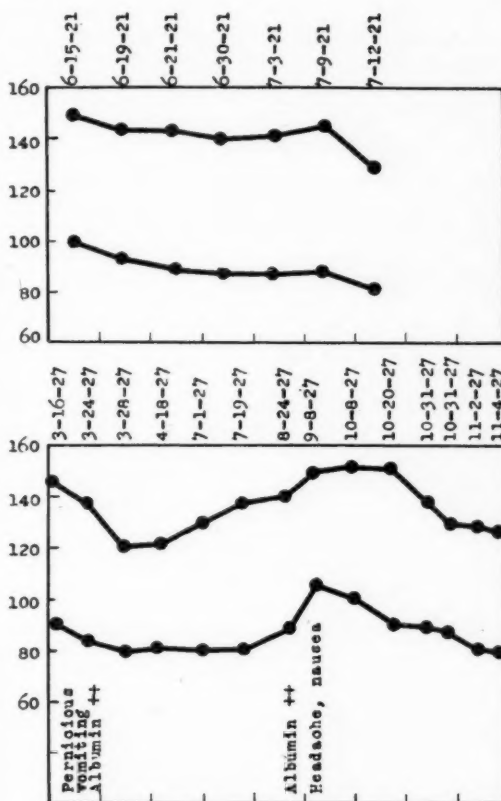


Fig. 1. Case 1.

cases. These are divided into two series of 110 and 165, according as they occurred prior to or after 1912. Up to that date, in accordance with the prevailing practice, the primary object in treatment was the promptest possible delivery of the patient, with the result, if the cervix was not fully dilated, that accouchement forcé, or vaginal or abdominal section was frequently resorted to. With this plan, their mortality was 24.8 per cent. Since 1912, he has become more conservative, and has tended to defer operative intervention until the cervix has become completely dilated. He also relies a great deal on venesection. With this method, he has reduced his mortality to 13 per cent. He thinks that a good many of the deaths that have occurred with the radical treatment are due directly or indirectly to the anesthetic.

CASE REPORTS*

Case 1.—Third pregnancy.

June 15, 1921. First examination. Age 26. Last

†Lazard, E. M.: *Am. Jour. Obst.*, 13:720 (June) 1927.

‡Williams, J. W.: *Jour. Am. Med. Assn.*, February, 1927.

*In the charts illustrating each case the upper line indicates systolic pressure; the lower line, diastolic pressure.

menses Oct. 1, 1921 (8.5 months). Complained of headache, dizziness, nausea and pain in the epigastrium. Blood pressure, 150. Urine: Albumin + + + +, granular casts, leukocytes and red blood cells.

March 4, 1925. First examination. Age 29. Last menses July 6, 1928 (8 months). Blood pressure and urine normal.

March 19, 1925. Edema of hands and feet. Very

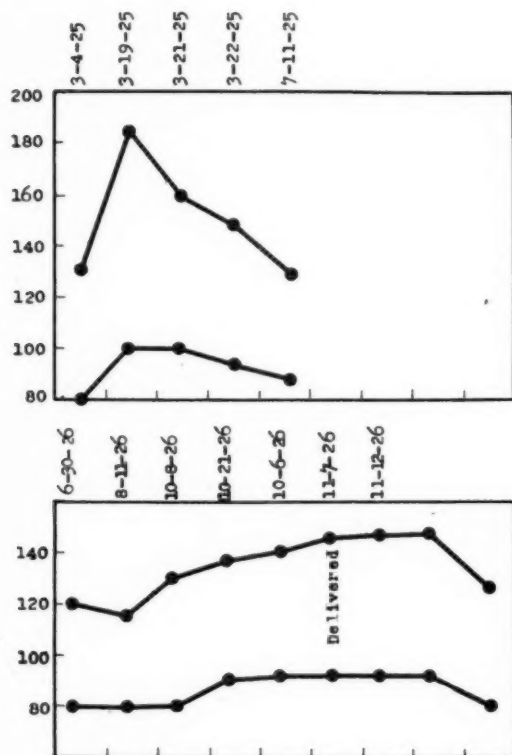


Fig. 2. Case 2.

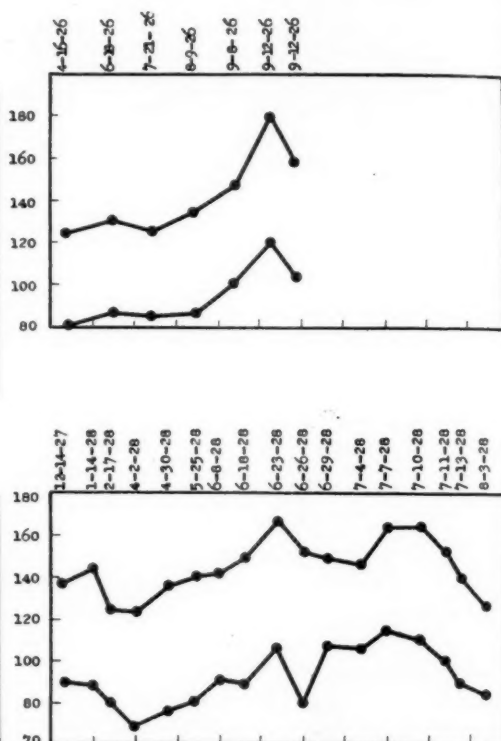


Fig. 3. Case 3.

June 19, 1921. Blood pressure 145-95. Albumin + +.

June 21, 1921. Albumin +.

July 3, 1921. Normal delivery.

July 12, 1921. Blood pressure 134-80.

Fourth pregnancy.

March 16, 1927. First examination. Age 31. Last menses Jan. 25, 1927. Pernicious vomiting, albumin + +, blood pressure 144-90. Ordered to bed for two weeks. Blood pressure dropped and albumin decreased.

July 1, 1927. Blood pressure and albumin again increased.

Sept. 8, 1927. Blood pressure 146-106. Headache. Diet limited to vegetables.

Oct. 18, 1927. Blood pressure 150-100. Headache and nausea. Put to bed, magnesium sulphate by mouth and milk diet.

Oct. 31, 1927. Normal delivery. Blood pressure 138.

Nov. 4, 1927. Blood pressure 130-80.

Case 2.—Third pregnancy.

Age 27. First seen three weeks before delivery, May 7, 1923. Blood pressure and urine normal.

Fourth pregnancy.

nervous, unable to sleep. Headache and dizziness. Blood pressure 185. Albumin + +. Treatment: Magnesium sulphate by mouth, milk diet, put to bed.

March 21, 1925. Normal delivery.

March 22, 1925. Blood pressure 150-90.

July 11, 1925. Blood pressure 130-90.

Fifth pregnancy.

June 30, 1926. First examination. Age 30. Last menses Feb. 15, 1926 (4 months). Blood pressure 120. Urine normal.

Oct. 24, 1926. Blood pressure 140-90. Urine normal. Diet restricted to vegetables.

Nov. 4, 1926. Blood pressure 144. Albumin +. Headache and dizziness. Magnesium sulphate by mouth. Milk diet. Ordered to stay in bed.

Nov. 7, 1926. Normal delivery. Blood pressure 144-90. Baby spastic, fontanelle began to bulge in 12 hours, death occurred in 24 hours from cerebral hemorrhage.

Summary.—Eclampsia was barely escaped in fourth pregnancy. In the fifth pregnancy the patient profited

by her previous experience, consulted a physician early and her blood pressure did not go as high.

Case 3.—First pregnancy.

April 16, 1926. First examination. Age 19. Last menses Dec. 3, 1925. Neuromuscular pains in arms

May 9, 1923. Blood pressure 144-100. Pulse 90. Ordered to bed. Magnesium sulphate by mouth.

May 17, 1923. Headache persistent (did not take salts).

May 20, 1923. 9:30, having labor pains. Blood pres-

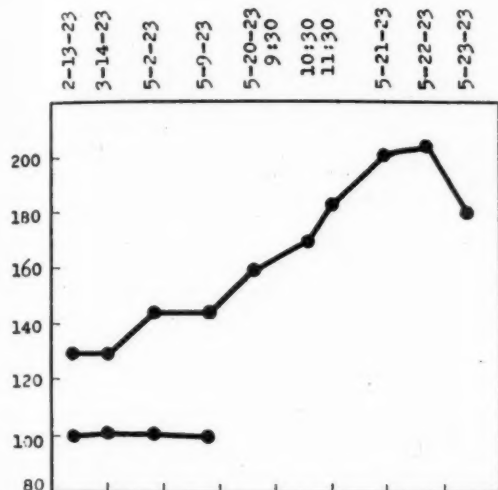


Fig. 4. Case 4.

and hands. Urine and blood pressure remained normal until eighth month.

Sept. 8, 1926. Headache, edema of feet and hands. Blood pressure 148-100. Albumin +. Milk diet and magnesium sulphate t.i.d. ordered.

Sept. 12, 1926. Blood pressure during labor 180-120. After delivery 160-108.

Second pregnancy.

Miscarriage at four months. No evidence at toxemia.

Third pregnancy.

Excessive vomiting occurred for three months with increased blood pressure but no albumin.

June 18, 1928. Last menses Dec. 14, 1927. Blood pressure 152. Trace of albumin.

June 23, 1928. Blood pressure 166. Nervous, dizzy, albumin ++. Magnesium by mouth. Rest ordered.

June 29, 1928. Patient up and about without permission. Blood pressure 150-108. Albumin +.

July 7, 1928. Headache, dizziness, visual disturbance, edema. Blood pressure 164-114. Albumin ++++. Ordered to bed.

July 10, 1928. Blood pressure 164-110. Delivered without incident. Salts and milk diet continued.

Aug. 3, 1928. Blood pressure 130-84. Albumin ++. Satisfactory convalescence.

Case 4.—First pregnancy.

Feb. 13, 1926. First examination. Age 18. Last menses Aug. 12, 1922 (6 months). Had influenza during sixth month.

March 14, 1923. Blood pressure 130-100. Pulse 124. Digitalis and magnesium sulphate by mouth.

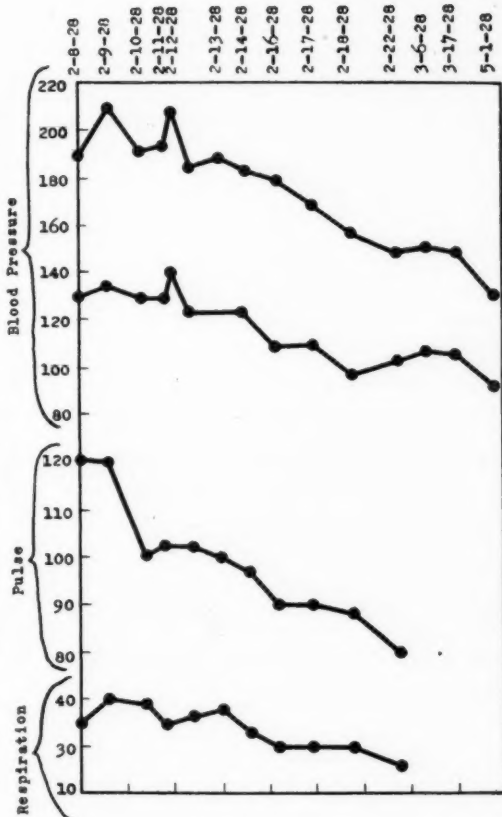


Fig. 5. Case 5.

sure 160; 10:30, blood pressure 170. Cervix dilated two fingers' breadth; 11:30 blood pressure 184. Cervix dilated three fingers' breadth; 11:45, first convulsion. Medium forceps delivery immediately following.

Convulsions continued and became more frequent, coma intervened, generalized edema developed rapidly. Pupils became dilated and failed to react. Anuria followed. Sweating increased frequency of convulsions. Magnesium sulphate given by stomach tube. Five hundred c.c. blood withdrawn and replaced by saline. Twenty-four hours later urine voided, albumin ++++. Consciousness regained in 36 hours. Intravenous saline repeated. Convulsions ceased 48 hours after first convulsion. Albumin persisted for 3 months.

Case 5.—Third pregnancy.

Feb. 8, 1928. First examination. Age 38. Has one child aged 16. Had one miscarriage at 6 months. Last menses May 25, 1927 (8.5 months).

Complaints of edema of feet, dyspnea, cough, bloody sputum, abdominal distention, headache, dizziness, epigastric pain, vomiting.

Blood pressure 190-130. Pulse 120. Respiration 34. Temperature 97.6. Albumin + + + +, edema of hands, feet and face, râles in both lungs, icterus, abdominal distention.

Treatment: Saline laxatives by mouth, digitalis, ammonium chloride, magnesium sulphate intravenously and intramuscularly.

After delivery saline laxatives, digitalis and magnesium sulphate intravenously were continued until the blood pressure decreased.

Last examination: Blood pressure normal. Albumin +. Some digestive disturbance the result of liver injury.

DISCUSSION

DR. W. H. CONDIT (Minneapolis): We have just listened to a very interesting paper by Dr. Mills on the management of non-hospitalized patients suffering from convulsive toxemia of pregnancy. Dr. Mills is to be congratulated on his success in his treatment of these cases without the advantage of hospital facilities or intravenous medication.

I do not like the term "eclampsia" and try never to use it in my teaching. It is derived from a Greek root meaning "a shining forth," and I can see nothing bright or shining about the convulsions of toxemia. I prefer the term "convulsive toxemia."

The mystery surrounding the developing fetus, including the changes in the physiological chemistry of the mother, is still a closed book. It is because of the unknown etiology of convulsive toxemia that the subject is so fascinating. Considerable data on the subject have appeared during the last two years, but we still know little more than we did a hundred years ago. Let us not forget that every case is a law unto itself, and in the treatment of the individual case we have no hard and fast rules or methods which we can follow.

The most convincing of the recent investigations on the subject is that of Titus and his co-workers, who claim proof that (1) a disturbance in carbohydrate metabolism in convulsive toxemia actually exists; (2) contrary to general opinion, hyperglycemia is not characteristic of the convulsive type, but (3) convulsions are directly related to and probably the result of hypoglycemic levels. There is usually a temporary rise in blood sugar content following a convulsion, indicative of the customary physiological response of the liver to muscular activity. The blood sugar values begin to seek hypoglycemic levels following frenzied efforts to effect recovery, thus causing fluctuating waves or levels. Therapeutic measures based upon this theory have been successful, but laboratory proof of its correctness is lacking.

There is no doubt that the major therapeutic measure in handling the toxemias of pregnancy rests in prophylaxis. It was my pleasure to read a paper before the Cook County Medical Society in Chicago eleven years ago, when we were first advancing and encourag-

ing the study of hypertension in pregnancy as a very valuable prophylactic measure. The value of this particular study has been greatly magnified in later investigations. The only other therapy of value after the toxemia has advanced to the convulsive stage is absolute isolation and complete muscular rest, with non-irritating eliminating measures.

Dr. Mills spoke of hot packs stimulating convulsions. This is no doubt due to the mechanical irritation in the mere application of the pack, causing the value of the skin elimination to be more than counteracted by the irritation of the application. The patient should have complete muscular rest, isolation, only hypodermic administration of morphine, chloral by bowel, and magnesium sulphate, if used, by hypodermic or intravenous administration. Intravenous injections of strong hypertonic glucose solution (50 to 75 gm. in 200 to 300 c.c. of distilled water, 25 per cent solution) are given over a period of not less than an hour and may be repeated after intervals of four or five hours. Dorsett reports thirty-eight cases in which as high as 100 c.c. of the 25 per cent solution of magnesium sulphate were given over a period of twenty hours.

Contrary to the general impression that hyperemesis and toxemias of pregnancy are accompanied by hyperacidity, the majority of cases are really achylic or hypochlorohydric. I have had some startling and pleasing results in the relief of early toxemias, especially those accompanied by hyperemesis, through the administration of 5 to 10 mm. of dilute hydrochloric acid, three times a day.

The immediate emptying of the uterus does not always relieve the patient of her convulsions, nor does it greatly increase the chances of recovery. Accouchement forcé is a treatment of the past. Delivery should be made with as little muscular or nervous irritation as possible.

Dr. Gordon, of Brooklyn, reports one hundred cases of hysterotomy, with 27 per cent mortality. In our experience, a very few of these extreme cases are fit subjects for hysterotomy. We recently had a patient in the University Hospital who had delivered eighteen miles from the hospital, the delivery accompanied and followed by convulsions, who died a few minutes after entering the hospital. The postmortem revealed a liver which was completely destroyed by multiple hemorrhages and the patient's condition was the same as though she had had an amputation of the liver. Glycogen deficiency in the liver sooner or later becomes equivalent to a partial or even total extirpation. It would seem that the therapy of the future must hinge solely upon the study of the liver metabolism.

Since convulsive toxemia occurs only in pregnant women, interference with pregnancy prior to convulsions is the main therapeutic agent at our command, but not the easiest to carry out. Until somebody demonstrates the cause of toxemia and the definite therapeutic means of removing this cause, a problem which is surely a laboratory one, we should adhere to the sound clinical principle of treating every case as a law unto itself, and not be led astray by the report of a small series of clinical results with the use of any single therapeutic agent.

MALTA FEVER: REPORT OF CASE

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Synonyms:

Undulant Fever
Mediterranean Fever
Gibraltar or Rock Fever
Goat Fever
Bruce's Septicemia
Melitensis Septicemia, etc.

MALTA fever has existed along the shores of the Mediterranean for centuries. Attention was directed towards many cases occurring in Malta; hence the name Malta fever. The relation of the disease in man to a certain disease in goats had been recognized for a long time. Bruce, in 1887, discovered the causative organism, which was thereafter named *Brucella Melitensis*. More recent laboratory studies, by Evans and others, have shown that *Micrococcus Melitensis*, the organism causing the disease in goats, and *Bacillus Abortus*, the organism responsible for contagious abortion in cattle, are closely related varieties of the same species of bacteria; hence the designation, *Brucella Melitensis*, variety *Abortus*, and *Brucella Melitensis*, variety *Melitensis*. In man the two varieties apparently produce the same clinical course of the disease.

In an article, read before the laboratory section of the American Public Health Association, October 16, 1928, Evans states that in the sixty-five cases, in which the age was given, the incidence of the disease was greatest in young adults, between thirty and forty years of age. Six of the sixty-five cases were in children under fifteen years of age; the youngest being four years old. Evans has also shown that the incidence is greater among males than females. Only twenty-seven out of a total of 117 cases, or 23 per cent, were in females. Her observation agrees with Kern, who compiled the figures for twenty-two cases.

Craig, in 1903, reported the first case of Malta fever contracted in the United States. However, Keefer probably described the first proven case in this country, in 1924, a case traceable to cattle. Since his report, sporadic cases have been reported from the following localities in this

country: New York, seven; Iowa, five; Michigan and Utah, three each; Maryland, two; California, Connecticut, South Dakota, Virginia, and the District of Columbia, one each.

The possible sources of infection are: (1) Raw cow's milk and goat's milk; (2) eating infected meat from cows and hogs; (3) handling infected meat, for example, in packing houses; (4) contact with cattle having contagious abortion.

The period of incubation varies from ten to fourteen days in man. As to symptomatology, Craig says, "There are no pathognomonic symptoms of Malta fever. The symptoms observed are so inconstant and confusing that no one of them can be said to be typical of the disease. A differential diagnosis is almost impossible in the majority of cases, without the aid of the microscope, and the blood agglutination tests."

However, the average case, according to the recent literature, is characterized by malaise, chills, fever, sweats, and neuritic or vague abdominal pains. In typical cases we have arthritis, with painful swollen joints without redness, severe headache, vomiting, and constipation or diarrhea. There are ambulatory cases that manifest no symptoms, other than malaise, and probably a slight rise of temperature towards evening.

Blood examination shows a marked secondary anemia, normal leukocyte count, or leukopenia, with a relative increase in lymphocytes. Awe and Palmer report a mononucleosis. The spleen and liver are usually somewhat enlarged, but may be normal. The average duration of illness is from three to twelve weeks, but may continue for longer periods, relapses being the most discouraging feature. The most common complication is orchitis, which is rather infrequent. Less common are pneumonia and cardiac failure.

Other diseases usually considered in the differential diagnosis, are: typhoid fever, malaria, tuberculosis, influenza, endocarditis and rheumatism.

The prognosis for the attack is good, the mortality being between 2 and 3 per cent.

The treatment is entirely symptomatic. Mer-

curochrome and acriflavine have been used intravenously. Vaccines have been tried, with results too indefinite to justify their use. Awe and Palmer report good results from intramuscular milk injections. The measures for the prevention of the disease in man are (1) pasteurization of all milk, the organism being killed at 142 degrees Fahrenheit for thirty minutes; (2) adequate measures for the control of the disease in cattle.

REPORT OF CASE

C. S., a man aged 31, a collector for a collecting agency, was admitted to the hospital November 5, 1928.

He complained of severe chills with fever, followed by profuse sweating, indefinite abdominal pain, weakness, loss of weight, poor appetite, and constipation. These symptoms, beginning about Oct. 1, 1928, developed gradually, at first only chilly sensations being present. At night he would awaken with a headache and indefinite abdominal distress. He was up and around for about a week, when he was forced to remain in bed, because of severe chills, fever, sweats, weakness, and abdominal pain.

When first seen at his home, Nov. 5, 1928, he was having a severe chill, generalized abdominal pains, flushed face, temperature 104, and pulse 90. He had lost fifteen pounds in weight since the onset of symptoms; there was generalized abdominal tenderness, most marked over McBurney's point and the right hypochondrium. He had had the usual childhood diseases, influenza in 1918 and in 1927. He never had had an attack of chills, fever, sweats, etc., simulating the above symptoms. He had had no operations nor injuries.

On admission to the hospital, his temperature was 104, pulse 96, respiration 24. There were no additional abnormal physical findings, except that the tenderness over McBurney's point was much less pronounced, there being quite generalized tenderness over the entire abdomen. The spleen was not felt. Blood pressure was 118 systolic, 65 diastolic. The blood picture showed a leukocyte count of 4,100, P. M. N.'s 64 per cent, lymphocytes 34, myelocytes 2. Red count, 3,950,000. Hemoglobin 66 per cent. Further blood studies on three later dates showed a constant leukopenia, the white cells never going above 5,000, the P. M. N.'s averaging 60 per cent, lymphocytes 37, myelocytes 3. The blood Wassermann was negative. Blood studies for typhoid, paratyphoid A and B, malaria, and a blood culture proved negative. The urine was normal on six consecutive daily specimens. Cystoscopy and pyelograms showed normal kidneys, ureters, and bladder. X-ray of the chest was negative. X-ray of the gallbladder showed it fairly well filled, normal in size and shape, emptying nearly completely. No calculi were demonstrated. Gastro-intestinal x-ray was normal, except for two probably small diverticuli of the sigmoid. After colon flush and x-ray, the barium was not present at these two small areas. The ap-

pendix was well visualized. X-ray of the spleen showed it to be probably slightly larger than normal. X-ray of the sinuses and teeth were negative.

On November 17, 1928, agglutination tests were made for Tularemia and Malta fever at the Minnesota State Board of Health. The agglutination test for Tularemia was returned negative, whereas the agglutination test for Malta fever was positive, being complete in dilution of 1 : 640, and partial in 1 : 1280. On Nov. 23, 1928, another agglutination test was positive for Malta fever, being complete in dilution of 1 : 920. On Dec. 1, 1928, a third agglutination test was returned positive for Malta fever, being complete in dilution of 1 : 960.

During the patient's residence at the hospital, the pulse was never above 100, usually between 80 and 90. Respiration was never above 24. The temperature was wave-like (undulant) in character, the patient experiencing on an average of one chill, with sharp rise of temperature, in each twenty-four hours. The highest temperature was 105, the average temperature being about 102, with each chill. The temperature would drop to about normal as abruptly as it would rise. Between the periods of pyrexia, his general appearance was that of a well patient, ready to leave the hospital. He would feel very well, except for soreness throughout the abdomen, which, on daily examination, presented inconstant findings. He had occasional epistaxis. The temperature fell by lysis. The temperature having been normal for three days, and the symptoms having abated, he left the hospital Nov. 30, 1928.

As to the possibility of the source of infection in this case, he gives a history of eating at various restaurants, not having a permanent boarding place. Raw cow's milk must be considered. He eats considerable pork, it being his favorite meat. Many times it was not properly prepared, and was very rare. Also, last September, while in Montana, he spent considerable time around the stockyards.

On December 6, 1928, the patient came to the office. He had gained ten pounds in weight. Hemoglobin was 83 per cent. He had no complaints, other than some weakness, which he was gradually overcoming.

Reports of cases, gathered from the literature, with the probable source of infection, in some instances, are given in Table I.

From the Public Health report in New York State, April 6, 1928, we have the following: From January 1, 1926, to April 6, 1928, twenty-four cases have come to their attention. One was acquired in the State Laboratory; the others were traced to drinking of raw cow's milk, it being demonstrated that the cows were infected with contagious abortion.

From the proceedings of the Staff Meetings of the Mayo Clinic, Rochester, Minn., June 29, 1927, Habein gives an analysis of four cases on record at the Mayo Clinic. In each case there

TABLE I

Author	References	Cases	Source of Infection
Carpenter, C. M., and Merriam, H. E.:	Jour. Am. Med. Assn. Oct. 16, 1926	2	Raw cow's milk
Duffie, Don H.:	Jour. Am. Med. Assn. Nov. 27, 1926	2	Not demonstrated
Gage, E. E., and Gregory, D. A.:	Jour. Am. Med. Assn. Sept. 11, 1926	1	Killing hogs
Acken, Henry S.:	Jour. Am. Med. Assn. May 29, 1926	1	Not demonstrated
Hull, T. G., and Black, L. A.:	Jour. Am. Med. Assn. Feb. 12, 1927.	4	Raw cow's milk (2) Not demonstrated (2)
Tod, M. L.	The Military Surgeon July, 1927	2	Not demonstrated
Fisher, M. E., and Garen, J. P.:	New York State Jour. of Med., July 1, 1927	1	Cattle
Williams, J. P., and Shaw, F. W.:	South. Med. and Surg. June, 1928	2	Not demonstrated
Warner, W. P.:	Pub. Health Jour. July, 1928	1	Not demonstrated
Awe, C. D., and Palmer, H. D.:	Am. Jour. Med. Sci. December, 1928	5	Bovine (3) Porcine (1) Not demonstrated (1)

was a history of ingestion of large quantities of raw cow's milk, and in one, contagious abortion had occurred in the herd from which the milk came.

CONCLUSION

Malta fever is no longer a disease restricted to the countries bordering the Mediterranean.

There have been sufficient number of cases reported since 1924, showing that it is endemic throughout the United States, and that it is probably more prevalent than heretofore supposed. In all cases of long protracted fever, where it is difficult to establish a diagnosis, the existence of Malta fever should be suspected, and blood studies made for the specific agglutination test.

ADDISON'S DISEASE: WITH A REPORT OF TWO CASES

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ADDISON'S disease is a morbid condition characterized by muscular and circulatory asthenia, gastro-intestinal disturbances and a peculiar pigmentation of the skin and mucous membranes. This disease was originally described by Thomas Addison in 1849,¹ and in 1855,² as a severe anemia. Addison described a clinical and not a pathologic entity, and the underlying pathology in true Addison's disease may show great variation, as we shall see.

The case which prompted this report was of singular interest to me and should prove so to those interested in tuberculosis and its treatment with heliotherapy. The second case being reported was a typical Addisonian syndrome and came under my observation while I was preparing to report the first case.

The condition is quite rare, as can be judged from the Mayo Clinic report by L. C. Rowntree,³ who states that only about 70 cases have been observed there in their many thousands of admissions. It is definitely more common in males, and in the third to sixth decades of life.

My first case is as follows:

E. L., a male aged 53, an employee and ex-patient at Glen Lake, reported for sick call on June 3, 1927, with the following complaints: (1) Nausea and vomiting; (2) loss of appetite; (3) extreme weakness.

About two weeks prior to this time he felt slightly nauseated after meals. There was no abdominal pain but a sense of discomfort in the epigastrium. He took a cathartic, after which he had a copious bowel movement and was practically free from symptoms for about a week; then nausea, vomiting, general malaise and pronounced weakness returned.

Past history revealed that he had been admitted to Glen Lake Sanatorium with pulmonary tuberculosis in 1919. This responded well to treatment but when the patient started exercise he developed a cervical Pott's disease in 1921. From the spring of 1921 until the onset of the present illness he had taken daily heliotherapy and had a beautiful tanning of the skin. He was discharged in the fall of 1925 with a healed tuberculous spondylitis and an arrested pulmonary lesion. There had been **no symptoms** and no complaints until the onset of the present illness.

Family history was negative.

Physical Examination: Head—eyes, ears, nose and throat negative, teeth and tonsils removed. Neck—

some stiffness as result of healed Pott's disease. Chest—heart, negative; lungs, harsh breathing and a few râles in apices after coughing. Abdomen—soft and slightly doughy; some tenderness in epigastrium; no other tenderness, masses, rigidity, or muscle spasm. Bilateral inguinal hernia with herniotomy scar on left. Extremities—muscle tone fair, considerable weakness. Skin—dry and rough, and uniformly pigmented. This pigmentation was considered the result of six years of heliotherapy.

A diagnosis of peptic ulcer was made and the patient was put to bed. On June 7th, a barium study of the stomach was made which revealed nothing abnormal and he was put on a bland diet. Patient felt well for several days but had a recurrence of symptoms on June 10th. Tr. Belladonna Mviii t.i.d. was ordered for three days. On June 13th he still had no relief. He was unable to retain even water. Abdomen was doughy. No fluid was demonstrated in the abdomen, no masses or tenderness and no jaundice. Findings suggested at that time some type of peritoneal irritation. Patient was given glucose and soda by rectum, and hypodermoclysis of normal saline solution daily for next five days with nothing by mouth.

June 17, the gastro-intestinal consultant advised Sippy management. The patient progressed favorably on the Sippy régime, the nausea and vomiting ceased, and his strength returned to some extent. The skin remained dry and rough and the abdomen doughy. Tuberculous peritonitis was suspected.

On June 22 a barium x-ray study of the stomach was made with the gastro-intestinal consultant. Diagnosis: Reflex pylorospasm. Patient was continued on Sippy regime and retention enemata of glucose until July 1, 1927; then he was put on a general diet. All symptoms subsided and patient began to feel well. Graduated exercise was rapidly increased without recurrence of symptoms. Temperature varied between 97.2 and 98.8 degrees (R) until Jan. 17, 1928.

On January 17, the patient had emesis of breakfast and emesis every hour during the following night. On the next day the pulse was weak and thready, the skin very dry and brown. Hypodermoclysis was given daily, with glucose per rectum until January 23, when soft diet was again given. Gastro-intestinal study on April 6, 1928, revealed gastric ulcer. Stools showed occult blood. On April 23, he was seen by the surgical consultant, who advised forced feeding and then exploration. The case was considered by all as peptic ulcer.

Patient had been without heliotherapy from June, 1927, to April, 1928, but was still well tanned (pigmented). He began sun cure again on April 23, and continued until June 7.

On June 7 patient awoke vomiting, and felt very weak and miserable. He vomited all day in spite of medication. Intravenous glucose was given on the morning of June 8, and a blood count made. This was: R. B. C. 350,000, W. B. C. 22,000, Hgb. 85 per cent; Differential—P. M. N.'s 89, Lymphos. 7, Monos, 4. Temperature 103° (M).

Vomiting persisted throughout the day, the patient became pulseless and very dehydrated in the afternoon and died early the following morning.

Autopsy Findings: Inactive tuberculosis of lungs; gastric ulcer—old; tuberculosis of adrenal (Fig. 1); tuberculosis of prostate; tuberculous abscess of kidney.

The diagnosis here was missed because of: (1) Simulation of complaints to those accompanying gastric ulcer; (2) failure to record blood pressure (again because of simulation to gastric ulcer); (3) obscuring of characteristic pigmentation by tanning due to sun baths.

The next case is clinically and pathological an Addison's disease due to tuberculosis of the adrenal glands.

J. K., a white male, aged 29, was admitted to Glen Lake Sanatorium, Aug. 11, 1928, with the following complaints: (1) Nausea and vomiting; (2) pains in left chest along the rib margin and in the right shoulder.

Illness dated back to January, 1928, when he began to feel weak. He lost his pep after a gastro-intestinal upset which was diagnosed as "stomach flu." Nausea and vomiting recurred; after this a feeling of weakness became manifest. Symptoms did not change much until March, 1928, when they became worse and in addition patient noticed that he was very dizzy when he assumed the erect posture after stooping over. About this same time he noticed that the skin of his face, forearms and abdomen was becoming darker than the rest of his skin.

Past history revealed the removal of a tuberculous epididymis in 1921; operation for gangrenous appendix in 1924; and an attack of bronchitis in 1923, which lasted ten days.

Physical examination revealed the following: A white male, 29 years of age, lying quietly in bed. Height 5 feet 8 inches; weight 124 pounds. There was a rather pronounced dark brown pigmentation of the face and neck, forearms, abdomen, and the skin over the lumbar spine and buttocks (Figs. 2 and 3). The skin was soft and smooth, muscle tone was not good but the flesh felt firm. No adenopathy noted. The eyes were prominent and the lid slit was wider than normal. There were pigmented spots just inside the corners of the mouth. The thyroid was palpable but not materially enlarged. There was a large scar to the right of the umbilicus (the result of a foot ball injury), a scar over McBurney's point, and one over the left groin. These scars were all deeply pigmented, as were the nipples. The genitalia were somewhat darker than the surrounding skin. The left testicle was absent. A scar over the right knee 1.5 x 0.5 cm. was not pigmented. Murphy percussion over left kidney caused excruciating pain.

Pulse rate 110. Blood pressure 70/48. Respiration 16.

Examination of the chest revealed only a slight amount of impaired resonance over the apices; breath sounds and voice sounds were normal; no râles heard. X-ray of chest revealed thickened pleura over base of left lung, with calcified and fibrotic tuberculosis involving the left lung as far as the third rib with a few small areas below this. Calcified and fibroid tubercu-



Fig. 1. Sections of adrenal glands, Case 1, showing numerous tubercles (T) and a large caseous process (C.T.).

losis involving the extreme apex of the right lung, with slight thickening of the pleura about it.

Laboratory Findings: Sputum—negative for tubercle bacilli. Urine—sp. gr. 1011; faint trace of albumen; no sugar; occasional granular and many hyaline casts per h. p. f. Blood—Wassermann negative, R. B. C. 3,410,000, W. B. C. 8,800, Hgb. 65%, Lymphos. 27, L. Monos. 6, Eos. 2; Widal—negative.

Diagnosis of Addison's disease was made and a fatal prognosis given. The patient was started on a Muirhead régime, which was continued until the day of his death. Adrenalin Mv by hypodermic caused a slight chill and discomfort so the dose was cut to Miii. This was supported by dried gland gr. iv by mouth t.i.d. and adrenalin Mxv by rectum once a day. The diet consisted of fruit juices, milk and cream and soft tasty foods of high caloric value. This régime was carried out from August 11 to August 28 with apparently good results. The nausea and vomiting subsided to some extent and the blood pressure hovered between 74 and 78 systolic. The fluid intake just about doubled the urinary output, but there was much fluid loss through emesis.

On August 29 ephedrin was given in place of the adrenalin as suggested by Chen and Schmidt³⁵. One

dose of 200 mgm. was given by mouth at 10:00 a. m. and at noon the blood pressure was 84. The patient complained of slight feeling of dizziness but no other symptoms. The blood pressure remained up between 84 and 90 systolic until 9:00 p. m.; the next morning it was 68/56. On the following day the Muirhead régime was again started. This was supported by rectal and subcutaneous administration of fluids. From September 1st until the 11th the patient's condition be-

Post-mortem examination revealed: tuberculosis of both lungs; tuberculosis of both adrenals (figure 4); tubercles in prostate; tubercles in left seminal vesicle; tubercles of lymph gland at head of pancreas; adenoma of thyroid; atrophy of right testicle.

Probably the first authentic record of what could be termed the Addisonian syndrome is the account of the illness of a young priest which

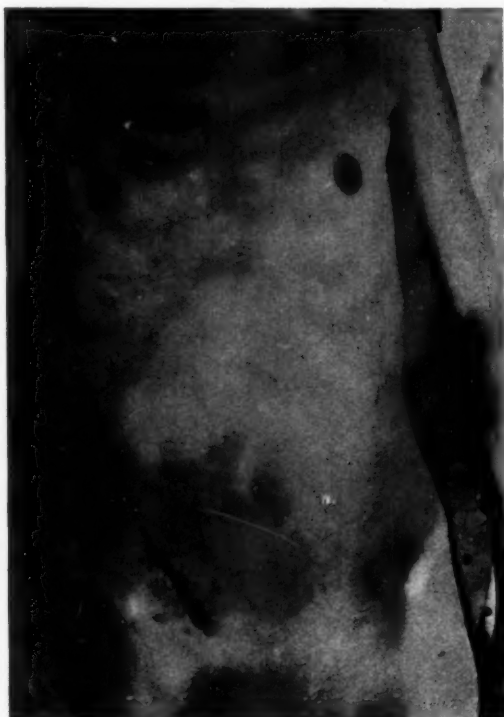


Fig. 2. Anterior view of body, Case 2, showing pigmented areas.



Fig. 3. Posterior view of body, Case 2, showing pigmentation over buttocks and lumbar region.

came progressively worse and he died on September 11, 1928, apparently in uremic coma. During the last forty-eight hours patient exhibited Biot type of respiration.

Blood Chemistry: Aug. 30—non-protein nitrogen 51, urea-nitrogen 25. Sept. 4—non-protein nitrogen 71, urea nitrogen 35. Sept. 9—non-protein 120, urea nitrogen 61.

The urine showed albumin, hyaline and granular casts at every examination. Systolic blood pressure hovered between 66 and 44 and the morning of his death the systolic pressure was 30, with absolutely no response to adrenalin.

During practically all of the last ten days of life the patient did not respond at all to adrenal therapy. Blood transfusion was considered as was gland transplant, but neither were attempted because of the shock which the patient experienced from even hypodermic injections.

was found by Mananon⁴ in a work dated 1554-57. Nothing more appeared in the records, apparently, until Addison¹ entered his first discussion of the peculiar form of anemia in 1849. This was followed by a lengthy discourse on the syndrome in 1855.

About this same time, reports on physiological work began to appear. Claude Bernard⁵ in 1848 reported some experimental work on the adrenal. Brown-Sequard,⁶ 1856, noted that excision of the adrenals in animals produced a condition simulating an exaggerated Addison's disease. Oliver and Schafer⁷ in 1894 found that an injection of an aqueous extract of adrenal glands slowed the heart and raised the blood pressure of animals.

The year 1896 marks the real beginning of knowledge of the adrenal, for in this year Abel⁸ isolated the active principle of the gland. From that date on, adrenal extract has slowly made its way into medicine, and our knowledge of adrenalin has increased. On the other hand, our knowledge of the exact functions of the adrenal bodies has not kept pace with that relative to its active principle.

The symptoms and physical findings in Addison's disease are discussed at great length in Addison's original work.¹ These symptoms are found in the pure Addisonian case which goes on to exodus as well as in a case of a secondary suprarenal hypofunction which recovers under treatment.

I plan to report some observations on suprarenal hypo-function secondary to toxins, amyloidosis, etc., at a later date.

Muscular asthenia is one of the most striking points in the diagnosis. The history may reveal a progressive weakness and indisposition to exertion. This may or may not be accompanied by dyspnea, though this condition always develops at some time during the disease. Since the Addisonian syndrome frequently follows influenza, this increasing lassitude and apathy are often considered signs of slow convalescence. Accompanying the muscular asthenia is found evidence of circulatory weakness. Before the days of the sphygmomanometer, changes in circulatory pressure were detected by changes in the pulse. Thus Addison described the pulse: "Perhaps large, but remarkably soft and compressible." Today we find with our modern methods a marked lowering of the systolic and diastolic pressures. The pulse reveals that "remarkably soft and compressible" state; and there is evidence of disturbed cerebral circulation. Early in the case the patient will complain of being dizzy when he assumes the upright after being in a stooped or prone position. Later on in the disease, lowering of the head will often cause a comatose condition. The heart rate becomes rapid as the blood pressure drops, a provision of nature to maintain circulation.

Gastro-intestinal manifestations are probably the most varied of any of the symptoms. These may vary from nausea, which is moderate, to severe vomiting, diarrhea, and abdominal pains. Nausea and vomiting are probably the most com-

mon gastric symptoms. Diarrhea and constipation, alternating or one alone, are frequent, while anorexia is found in practically all cases. Addison says: "Slight pain or uneasiness (nausea) is from time to time referred to the region of the stomach, and there is occasionally actual vomiting, which in one instance was both urgent and distressing." Lockwood²⁶ reported gastro-intestinal manifestations in six cases of Addison's dis-

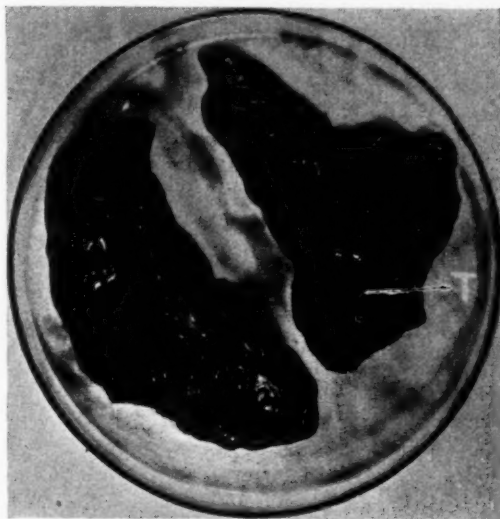


Fig. 4. Photograph of adrenal glands, Case 2, showing tubercles. These glands were a solid mass of tubercle formation.

ease. All six showed some disturbance. There was achlorhydria in three, nausea and vomiting associated with dizziness in one, constipation in three, diarrhea in two, and a gastric ulcer was suspected in one case. Rowntree found some gastro-intestinal disturbance in all his cases, and says that nausea and vomiting in terminal stages often resist all attempts to control.

According to Rowntree,³ the criteria for diagnosis of Addison's disease are: (1) low blood pressure, (2) muscular asthenia, and (3) pigmentation. Addison described the pigmentation as a "... most remarkable discoloration taking place in the skin ... This discoloration pervades the whole surface of the body, but is commonly most strongly manifest on the face, neck, superior extremities, penis and scrotum, and in the flexures of the axilla and around the navel. It may be said to present a dingy or smoky appearance, or various tints or shades of deep amber

or chestnut color." Rowntree had devised a tintometer for the accurate gradation of the coloring in his patients. One of my cases (Case 1) presented a generalized bronzing of the skin which was attributed to his prolonged treatment with heliotherapy.

Pigmentation of the oral, vulvar and anal mucosa is described by some observers. I found pigmented spots in the oral mucosa in one of my cases, and also pigmentation of the retina as described by A. L. Brown.⁹ The most frequent location is the lips, and oral and buccal mucosa. Rowntree and Ghrist,¹⁰ White and James,¹¹ and Butznov¹² have, on the other hand, reported cases without pigmentation in any location. The case of Rowntree and Ghrist¹⁰ is the only one occurring in the Mayo Clinic series of over seventy cases. Pigmentation likewise was absent in two of Coneybeare's¹³ twenty-nine cases.

Early in the disease the urinary tract does not reveal evidence of injury or malfunction, but as the process goes on there is a decreased elimination of water and solids, with a piling up on the blood stream of the nitrogenous waste products. The anuria which develops is probably due to the diminished blood flow through the kidney, and to the lowered pressure under which it flows.

The pains described by Addison referable to the gastro-intestinal tract were noted in my cases, as well as in those of others. Rowntree reports, in his series, pains in the epigastrium, lumbar region and flanks, which may be vague, dull or deep aching pains in both arms and shoulders. These probably are adrenal in origin.

The dyspnea, collapse and syncope which develop in all cases are undoubtedly adrenal in origin. In the extreme stage, the patient goes into a state resembling shock due to the superposition of uremia on the already anemic vital centers, and usually dies in the state of coma. In this connection it is interesting to note the type of respiration which develops in the terminal stage of Addison's disease. Biot first described it, and it bears his name. Rowntree⁸ has drawn attention to it, and I noticed it in one of my cases. This type of respiration is characterized by short and rapid breathing interrupted by pauses of ten to thirty seconds.

The blood in Addison's disease was thought by Addison² to show pronounced anemia. Averbek¹⁵ thought that there was an anemia accompanied by a reduced blood volume. Buhl¹⁶ was

of the opinion that there was a sharp decrease in the total number of red cells, while Newman¹⁷ stated that the red counts and hemoglobin percentages were low. Osler¹⁸ on the other hand says anemia is not an essential feature, and Brown and Roth¹⁹ of the Mayo Clinic found anemia in six per cent of cases, and believe it to be the exception rather than the rule. From the standpoint of blood chemistry, we find in the nitrogenous elements just what we expect, namely, a marked increase. Non-protein nitrogen in one of my cases ran from 51 to 120 mgm. for 100 c.c., while the blood urea nitrogen ranged from 25 to 61 mgm. In sixteen cases Rowntree⁸ reports a blood urea nitrogen of 30 or over in ten, 50 or over in four, and 90-100 in two. The blood sugar is reported by Rosenow and Jugutts²⁰ as fluctuating around normal. There are, however, relatively few blood sugar determinations reported. Chapman²¹ in reporting one case of Addison's found the glucose tolerance curve to be quite flat, falling off very slowly, thus indicating a raised tolerance for glucose. There is probably no laboratory finding, then, characteristic of Addison's disease other than the adrenalemia.

C. L. Spohr and R. A. Moore²² have recently reported an analysis of the pigment derived from the lymph glands in a case of Addison's disease. The pigment was found to be a true melanin and has the following composition: carbon 54.8, hydrogen 5.56, nitrogen 11.24, sulphur 3.10.

The underlying pathologic conditions in Addison's disease probably fall into two groups described by Bittorf,²³ which are: Group 1: includes those cases in which there is an essential or idiopathic adrenal insufficiency, and no infectious agents or tumor growths can be demonstrated. There exists in these cases an atrophy or sclerosis of the adrenal tissue.

Group 2: includes those cases of secondary adrenal insufficiency due to tuberculosis or tumor growth.

Thomas Addison reported, in 1855,² eleven cases of the clinical syndrome now bearing his name, and his post-mortem reports reveal: Tuberculosis of the adrenals in seven cases, carcinomatous invasion in two, and simple atrophy in one. Bittorf²³ collected from the literature forty-seven cases showing atrophy or sclerosis, and reported five cases of his own, three of which showed primary insufficiency. Medlar,²⁴ in a review of the medical literature of the United

TABLE I
CLASSIFICATION OF CASES REPORTED

	Cases	Group 1	Group 2	
Addison ²	11	1	7 Tbc.	3 Ca.
Harbitz ²⁷	22	2	20 "	
White and James ¹¹	1		1 "	
Rowntree and Ghrist ¹⁰	1		1 "	
Coneybeare ¹³	29	7	22 "	
Medlar ²⁴	2	2		
Warthin ²⁵	3	3		
Hedinger ²⁸	15	1	14 "	
*Bittorf ²³	5	3	2 "	
Butzow ¹²	1		1 "	
**Wakefield and Smith ²⁰	3	1	1 "	1 toxic
Wiesel ²⁶	1		1 "	
***Rowntree ³	9	1	8 "	
Higgins ³⁰	1		1 "	
Philpott ³¹	14	1	7 "	4 Ca.; 1 myc. fung., 1 amyloid.
Feinblatt ³²	1		1 "	
Petter	2		2 "	
	121	22	89 Tbc.	7 Ca.; 1 toxic, 1 myc. fung., and 1 amyloid.

*Bittorf also reports 47 cases which he collected to show atrophy.

**One case here was a toxic adrenalopathy which recovered.

***Rowntree reports on 48 cases but has pathologic evidence on 9 only.

States, says all cases of Addison's disease reported with necropsy findings fall into the second group. The two cases of his own fall into Group 1. It is interesting to note here that several observers, namely, Medlar,²⁴ Warthin,²⁵ Bittorf,²³ and Wiesel²⁶ report a hyperplasia of thymus, tonsils, spleen, lymph nodes, and Peyer's patches in association with destructive lesions of the adrenals. Wiesel²⁶ reports one case in which there was tuberculosis of the adrenals, but no symptoms of Addison's disease. Further investigation in this case revealed an excess of chromaffin tissue outside the adrenals. He also reports a case of Addisonian syndrome with no lesion of the adrenals, but showing an absence of accessory chromaffin tissue.

It is generally conceded then that in addition to the lesion in the adrenal there is a congenital inferiority of the chromaffin system as a whole.

I have been able to find 121 cases of Addison's disease reported showing pathologic evidence of

ber of cases I have found in the literature to 208.

The prognosis of a true Addisonian syndrome is uniformly fatal, although there may be a period of weeks or months between the first and final attacks. This is well brought out in my first case.

Treatment of Addison's disease is probably as unsatisfactory as anything could be. The accepted form of therapy today is that outlined by A. L. Muirhead,³³ a professor of pharmacology and himself a victim of the malady. While able to record his observations and direct his own treatment, Dr. Muirhead relieved his symptoms with 0.5 to 1.0 c.c. of 1:10,000 adrenalin hydrochloride by hypodermic, b.i.d. with 2 c.c. of 1:1,000 adrenalin hydrochloride in physiologic saline, by rectum b.i.d. Slowly his disease progressed to the point where he was unable to administer to himself and Dr. L. G. Rowntree³⁴ reports the following changes and additions to the Muirhead regimen:

Adrenalin hydrochloride 1:1000.....	Miii (h) b. i. d	} at h. s.
Whole adrenal extract.....	3/200 gr. (rectum)	
Whole gland extract.....	20 gr. (mouth)	

atrophy in 22, tuberculosis in 89, carcinoma in 7, mycosis fungoides in 1 and amyloidosis in 1. There are 39 additional cases reported by Rowntree without necropsy or operative report. Bittorf has reported 47 cases which he collected to show atrophy. This would bring the total num-

This régime held the symptoms and progress of the disease in abatement for a time but could not stave off the final outcome.

In attempting to use this form of treatment one must first determine the patient's tolerance to adrenalin. It is interesting to note that these

people usually have a hypersensitiveness to adrenalin because of the gradually diminishing secretion from their own glands. Therefore, one must start with small doses and gradually build them up to point of tolerance. The symptoms of overdose are: dizziness, abdominal pain, increase in nausea, and, when given by rectum, tenesmus.

Wakefield,²⁹ in a very comprehensive article, says "little can be done in the way of treatment. Rowntree claimed results after using Muirhead régime. Ephedrin has been used but is inferior to the Muirhead régime. Many have been disappointed after suprarenal transplants."

I feel that suprarenal transplant is the hope of the future, if done early and small grafts used at intervals rather than one large transplant which will overload the body with adrenalin as well as foreign protein.

In conclusion:

1. Addison's disease is a clinical entity due to a pathologic change in the adrenal glands or accessory chromaffin tissues, or both, due to an invasion of these tissues by an infective or infiltrating process or an atrophic and sclerosing metamorphosis. 2. The disease may subside and then recur but is probably 100 per cent fatal.

3. The treatment to date seems to be the Muirhead régime, though gland transplant may be the salvation of the future.

4. Toxic adrenalopathies following acute infectious diseases, arsphenamine injections, starvation, fatigue and excessive nervous shock, show symptoms of Addison's disease but recover and probably are the cases which have been reported as Addison's disease with recovery.

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TYPES AND TREATMENT OF CHRONIC ARTHRITIS*

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AT all times and in all ages chronic arthritis has been a significant factor in the health of the people, and it has taken its toll in life, suffering and disability with painful regularity. It is only in recent years that medical science has turned its attention to such a commonplace disease, and at present there are signs that the medical profession, and in certain instances the governments, are definitely interesting themselves in studying this menace in an effort to lessen its frequency and to relieve those afflicted with it.

England has done more than any other country to consider rheumatic diseases in their various relationships to the industrial worker. Rheumatic diseases come third on the list of those conditions which cause industrial workers to consult physicians in the British Isles; bronchitis comes first, and diseases of the digestive system second. There are 15,000,000 people in the insured group of the industrial panels in England, and practically all wage earners between the ages of sixteen and sixty-five are included in this number. Sir Walter Kinnear, in 1927, found that approximately one-sixth of the total period for which sickness and disablement benefit was paid to men was due to rheumatic diseases. The corresponding figure for women was one-seventh. It was estimated that about \$20,000,000 was paid out of the general fund for rheumatic diseases, and if the loss in wages were taken into consideration, the sum would amount to about \$85,000,000 loss for one year (1927). These figures show what a burden these diseases throw on the state, and on the patients and their families. In May, 1928, at Bath, England, a conference on rheumatic diseases was held. It was pointed out that facilities were needed to afford treatment for the masses of the people, and that these facilities must include means to provide for: (1) The discovery and elimination of foci of infection; (2) the supervision and control of the adminis-

tration of drugs; and (3) the use of various methods and physical agents.

Last year, in the United States, a committee was formed for the study of chronic arthritis; the committee hoped to create an interest on the part not only of the medical profession but of the industrial world, insurance companies, and so forth; so that they would take more cognizance of the disease, aid in the efforts to render its occurrence less frequent, and provide means whereby the large number of sufferers from this disease might receive the benefits of modern medicine in its broader sense. In the past, these sufferers have received little or no attention in our larger hospitals and institutions, and consequently have drifted to the irregular practitioners and cultists. Our hospitals have been filled with patients with other diseases of a more acute type, and an organized effort has not been made to take care of these patients, to make a diagnosis based on a carefully conducted general examination, or to provide facilities for treatment, and especially instructions as to how to live with the disease to the best advantage. Lord Dawson made the remark: "We must think not only of the many days of sickness and the heavy loss of life, but we must also consider how chronic arthritis affects the quality of life."

Last year at The Mayo Clinic about one of every fourteen patients had one of the rheumatic diseases which constituted a primary or secondary diagnosis: a total of more than 5,000. The rheumatic diseases in their broadest conception include at one end of the clinical scale acute rheumatic fever and at the other end the various forms of chronic osteo-arthritis. Between these two extremes lie the many different forms of peri-arthritis, myositis, fibrositis, neuritis, and so forth. It is generally taught that the various members of the rheumatic diseases are streptococcal in origin, and some believe that there may be a chain of gradual transition from one group to the other, their main differences depending on variation in the organism, and inborn or acquired differences in the host. In spite of

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possible bacteriologic relationships, however, certain clinical entities separate themselves, and it is important to distinguish between the acute forms which do not leave permanent injury to the joint but injure the heart (for example, rheumatic fever), and those chronic forms, which usually spare the heart but produce marked residual joint deformity. Rheumatic diseases exhibit great diversity in their response to the different forms of treatment.

Although this discussion will consider the chronic forms mainly, it should be remembered that chronic arthritis may result from acute arthritis, or it may begin insidiously, being chronic from its inception. Acute rheumatic fever (inflammatory rheumatism, acute articular rheumatism) rarely if ever produces chronic infectious arthritis, even after repeated attacks. It is characterized by its acute, migratory, polyarticular nature, its response to salicylates, its proclivity to cardiac involvement, and the fairly rapid cessation of the arthritis after about two or three weeks. Fortunately, acute rheumatic fever is not so common as it was formerly, either in England or in this country.

Another type of acute arthritis may, however, lead to chronic disease of the joints; it may be either the specific infectious type of known bacteriology, or the so-called acute nonspecific infectious arthritis. Chronic infectious arthritis, however, generally comes on insidiously, affecting only one or two joints at first and gradually spreading to many, or even to all, the joints of the body. The disease usually runs an indefinitely prolonged course, but pain and disability vary in different persons. In some instances recovery may be quite remarkable, and one is often astonished at the good functional results that may ensue in spite of marked bony changes in the affected joints. Many of our patients who have been severely incapacitated for long periods, even bedridden, regain their health to an unusual degree, getting about adequately with only a residual stiffness or limp. On the other hand, the course is often a pitiful one. In some instances the disease may be prolonged for years, gradually crippling the patient and forcing him out of work. In others, it may progress rapidly to complete disability. In a few it may progress so malignantly that the patients, terribly crippled, finally succumb, their resistance lowered by the widespread and prolonged infection, death re-

sulting not from the rheumatic disease but from some complication or intercurrent disease.

In general it would seem that there are two sharply differentiated types of chronic arthritis. One type, which is more common in females, may begin either in childhood, when it is known as Still's disease, or in early adult life, usually before the age of forty, then called rheumatoid arthritis or arthritis deformans. The joints become swollen, the roentgenograms show little if any bony destruction, and the patient may be completely disabled by the disease. Anemia and pallor, and often lymphatic enlargement, may develop.

The other group of chronic arthritis is that affecting older persons, and has been called "osteoarthritis," "hypertrophic arthritis," and "destructive arthritis." The symptoms here are decidedly more chronic, the patient as the years advance having stiffness of the hip, stiff, painful, creaking knees, and so forth, often limping about, using a cane. The general health is fairly good, and the patients will often volunteer the information that if it were not for their joints they would be perfectly well.

These are the main clinical types of arthritis, but when one studies the group a little more closely, such a simple division into two groups is not satisfactory. A patient may actually have rheumatoid periarticular arthritis in one set of joints and hypertrophic or destructive osteoarthritis in another. Other definite types are readily discernible. There have been all sorts of classifications for chronic arthritis, and to the casual reader no doubt each one adds to the general confusion. It is for this reason that the American National Committee on Rheumatism has adopted the classification of Nichols and Richardson which is based on pathologic and roentgenologic changes and divides arthritis into two groups, proliferative and degenerative. Goldthwaite, in speaking of these same types of arthritis, used the terms atrophic and hypertrophic, respectively, and the latter are the terms usually used in referring to these types of arthritis. The atrophic type includes those cases in which periarticular involvement is marked and bony atrophy is shown in the roentgenogram; the hypertrophic group includes those which do not show much periarticular involvement, but hypertrophy at the bone and joint margins with perhaps degenerative changes in the deeper portions of the joint.

For purposes of orientation the analogous classifications in most common use are compared thus:

Author	Classification based on	Two main divisions
Nichols and Richardson (American)	Pathologic data	Proliferative and degenerative
Goldthwaite (American)	Pathologic roentgenologic data	Atrophic and hypertrophic
Garrod (English)	Clinical data	Rheumatoid and osteo-arthritis
Fischer (English)	Anatomic site	Synovial and chondro-osseous

Although the classification of Nichols and Richardson is a good working basis it is still open to many criticisms. Many believe that both the major divisions have a common infectious basis and should therefore be simply called "chronic infectious arthritis." If a classification based on etiology could be formulated it would be more acceptable. In our experience it seems evident that several instances of hypertrophic arthritis may be entirely different entities, from entirely different causes. For example, the hypertrophic arthritis of a Heberden's node, of symptomless senile lumbar spondylitis, or of a gonorrheal knee, have little in common with each other or with the hypertrophic "baseball-finger" joint, with the hypertrophy of a "typhoid spine," or with the late stage hypertrophy of non-specific infectious arthritis. A roentgenologically similar pathologic response is their only point of common identity. It would seem therefore that a classification is not complete with a pathologic response as the sole basis of differentiation.

A CLINICAL CLASSIFICATION

The Mayo Clinic has adopted, with due regard to its limitations, a clinical classification based on presumptive etiology, the basis of which seems justifiably supported by a study of the clinical data and course of the various types. Although it includes more than thirty types or variations of arthritis, it nevertheless indicates only five great clinical divisions. These five divisions result from the five great causes of joint-trouble which are, practically speaking, the five causes

of all disease: (1) infections and their toxins, (2) trauma, (3) retrogressive tissue changes (senescent phenomena), (4) chemical disturbances (gout and hemophilia), and (5) trophic disturbances (Charcot's disease). The joints therefore seem subject to the same insults that affect other tissues.

GENERAL CLINICAL CLASSIFICATION OF ARTHRITIS

1. Infectious arthritis

Known to be specific infectious

Tuberculous

Gonorrheal

Pneumococcic

Typhoid

Syphilitic (spirochetal, not arthropathy)

Staphylococcal (septic)

Probably specific infectious (with toxins)

Rheumatic fever (streptococci or their toxins)

Arthritis with amebic colitis (amebic or secondary streptococci or their toxins): rare

With ulcerative colitis (secondary streptococci or their toxins): rare

With certain skin diseases (impetigo contagioso, psoriasis)

Nonspecific (chronic infectious type)

Articular nonspecific infectious arthritis

Nonarticular localization (myositis fibrositis, lumbago)

2. Traumatic arthritis

Extrinsic trauma (generally acute): (1) articular (traumatic, baseball fingers), and (2) nonarticular (nun's knees and housemaid's knees, sprains, strains)

Intrinsic trauma (generally chronic): postural arthritis, static arthritis of obesity

3. Senescent arthritis

Fingers (Heberden's nodes)

Hips (morbus coxae senilis)

Hypertrophic spine of the elderly

Knees (often in combination with static arthritis of obesity)

4. Gouty arthritis

Acute (recurring with complete remissions)

Chronic (progressive with residual deformity)

5. Arthropathy

Secondary to lesions of the central nerv-

ous system (syringomyelia, Charcot's disease)

Secondary to certain lung conditions (pulmonary osteoarthropathy)

Accurate differentiation of the various groups and types of chronic arthritis is essential not only for prognosis but for treatment. One program of treatment applied indiscriminately must often end in failure for there is no one plan of focal removal, one diet, or one method of medication for all cases of arthritis. For chronic arthritis a simplified condensation of this classification is as follows:

Chronic infectious arthritis: (1) specific and nonspecific, and (2) articular and nonarticular (peri-arthritis)

Chronic traumatic arthritis: (1) extrinsic trauma (generally acute), and (2) intrinsic trauma (generally chronic), for example, static form of obesity

Chronic gouty arthritis

Chronic senescent arthritis

In each there is a clinical basis for the presumptive etiology. In chronic infectious arthritis the basis is (1) presence of foci from which positive experimental lesions can usually be produced in animals, and (2) the important evidences of systemic infection with toxemia: namely, the progressive polyarticular course, the secondary anemia, alterations in blood sugar, metabolism, reduction in gastric acids, afebrile tachycardia, mild albuminuria, vasomotor phenomena such as cold, sweating extremities and lowered blood pressure, the weight loss, loss of appetite, adenitis, and complications of iritis, pleurisy, and pericarditis. The basis of diagnosis in chronic traumatic arthritis consists of: (1) its manifestations strictly limited to traumatized joints; (2) lack of systemic geography or polyarticular progression; (3) lack of systemic signs of infection (and toxemia) or infectious complications; and (4) evidence of relief chiefly if not solely by removal of inciting trauma.

The diagnosis of chronic gouty arthritis rests on the character of its preliminary course of acutely recurring arthritis with complete remissions followed by the chronic course with its typical "signs": the tophi, high uric acid and evidence of secondary nephritis and the general lack of the secondary manifestations of infection, such as anemia and tachycardia. The differentiation of chronic senescent arthritis is based on

the late appearance, mild progressive course, minor symptoms, localization in certain joints, such as the spine and distal phalangeal joints, hips and knees, and absence of infectious phenomena.

VARIOUS CAUSES OF CHRONIC ARTHRITIS

Certain authors believe that a familial arthritic diathesis cannot be doubted. Members of certain families seem more prone to rheumatic diseases than others. In some instances heredity undoubtedly acts as a predisposing factor; in others, it may be merely a question of common errors of general and focal hygiene. In the types designated here as "infectious" it would seem that there must be a virulent organism as a cause. The presence or absence of focal infection, however, is not the sole explanation, for weighed against it there is always the resistance of the individual person. A patient's arthritic status may change, although his foci do not, because his resistance is variable.

Hence the relationship of the predisposing and aggravating factors of exposure to sudden barometric or temperature changes, natural or surgical alterations in endocrine function, exposure to unrelated infectious diseases, and so forth. Hence also the rationale of many nonspecific measures of treatment: the stimulation of resistance by maintenance of general health, the application of metabolic stimuli by treatment with products of the thyroid gland, high calorie feedings, proper elimination, the more general physiotherapeutic measures, such as sunbaths, tonic exercises, the maintenance of normal weight, all of which are supposed to keep up and increase the immune bodies (whatever they may be) present in the blood.

The natural tendency for the human body is to resist harmful influences such as too much heat, too much cold, too much or unsuitable food and the harmful germs everywhere. If through abuse of our bodies by one means or another, by mental and physical fatigue persistently present, this resistance is lowered, arthritis of one form or another may develop.

TREATMENT

At The Mayo Clinic for many years the orthopedic section was responsible for the care of patients with arthritis, but as their number increased, with a realization that these patients

were in need of further treatment, medical aid was sought. This resulted in a combined "arthritis-medical service." By this arrangement the orthopedic service carried out only what it rightfully should, that is, the surgical treatment, the application of appliances and collaboration in the supervision of physiotherapy. Although treatment can be roughly divided into medical, surgical and orthopedic, an absolute separation of authority is not to the best interests of the patient and the combined efforts of both groups are advantageous both for the early "medical phase" and the later "orthopedic phase" of the disease.

The treatment depends largely on the etiology and the clinical type of arthritis presented. Certain significant variations of treatment are made for the different clinical forms, the differences being mainly the adoption of radical or of conservative focal removal, prolonged or intermittent physiotherapy, regard or disregard for special dietary instructions, and the rigid or variable application of vaccine and medical treatment. A brief outline of comparative treatment is shown in the tabulation.

CHRONIC INFECTIOUS ARTHRITIS

Nonspecific Form.—In this form the ingenuity of the physician and the resources of the patient are most sorely taxed. Its characteristic is one of prolonged progression and although in a sense it is self-limiting, it does not bound its course by the days or at most the few weeks which many of the more specific forms often do. Whereas the complicating arthritis of the infectious diseases of known etiology, such as pneumonia, typhoid, gonorrhea, or the generally mild post-operative forms, usually burn more or less acutely to a rapid inactive residue, a disheartening span of years usually comprises the activity of nonspecific infectious arthritis.

Because of the grave potentialities of chronic infectious nonspecific arthritis, it is doubtful if a conservative attitude is ever justified for any possible, even questionable, focus as long as progressive activity of the arthritis remains, if the general condition of the patient will permit such removal. Until the exact influences and ramifications of focal infection are demarcated, only a judiciously radical procedure seems fair to the patient. The regrets over late discovery of a focus, heretofore ignored, are more real than

those over the early removal of a possible focus on fair grounds of suspicion. Judgment and experience will indicate how far the program of radical removal shall extend. In short, "questionable" fibrous tonsils, devitalized teeth or roots are generally best removed. On the other hand, the vexing problem of intestinal infection with toxemias seems unsettled and except for surgical removal of clearly infected cul-de-sacs, gallbladder and appendix, we are conservative in treatment of the intestines, relying for the most part on normally eliminative diets and nonlaxative adjuvants. Promises of relief by removal of foci should be as conservative as the removal itself should be radical. Two decades of disappointment adequately prove that the removal of a focus will only occasionally be promptly followed by spontaneous recovery. The joint lesions are not often apparently the result of toxins alone, but seem to be the result of actual metastatic implantation of germs elaborated at a primary and distant focus. The removal of distant foci does not, therefore, "remove the poison" when the metastatic joint infection is firmly implanted.

The theory of focal infection has been advanced chiefly by the American field of medicine. In spite of its failures and the variability of immediate results from removal of foci, it is interesting to note that in Glover's report to the Ministry of Health in England the following statement was made: "The theory of focal sepsis has brought fresh hopes into the outlook upon chronic arthritis, and rightly considered, early acted upon and soberly applied, it greatly improves the prognosis of at least half the cases."

The popularity of physiotherapy has endured for fifteen centuries, and yet the ancients' lesson of the hot bath, the soothing cold compresses, and the "laying on of hands," seems to have been more appreciated, in this country at least, largely by the cultist. An impressive percentage of patients turn to his services, often with undeniable improvement, from the physician who relies on removal of foci or salicylates alone. Physiotherapy applied daily over a long period of time by trained physicians or physiotherapy technicians is a form of treatment which few patients can afford and few localities in America offer. We have little to compare with the innumerable natural and artificial community Spas of Europe. Until the number of trained physiotherapists is sufficient, the patient will have to

learn to help himself by simple home methods. Even where available, the daily inconvenience and expense of professional service is soon refused by the patient who would gain much more by a combined program of his own daily physiotherapy supplemented by periodic professional supervision. The importance of daily adequate self-treatment by means of the simple electric baker, hot and cold compresses, contrast baths and showers, hot baths, simple yet specific exercises, if necessary hot sand or salt bags, is evident. For the more fortunate or the more desperate patient a prolonged stay in a warm equable climate is indicated, but even then is too often more palliative than curative.

The English surgeon is probably correct who insisted that all arthritis of whatever primary cause is influenced and modified by trauma. Even the physiologic trauma of normal weight-bearing seems to lower the resistance of the joints of the lower part of the back and the lower extremities so that they are the most common sites of infection. Whenever abnormal trauma is superimposed, by obesity, by pronation defects in the feet, or other postural defects, these need special care. Especially in obese patients with diffuse infectious arthritis must the superimposed trauma of abnormal weight-bearing be removed from the doubly irritated lower extremities by weight reduction, and mechanical supports as needed.

Rare is the patient with arthritis who has not been advised regarding an arthritic diet; such diets are generally defined as restrictions in proteins or carbohydrates, in general or in particular, depending on the mode of the day. The cycle of dietaries for arthritis continues to revolve. After 1683, when Sydenham first attempted to differentiate various types of arthritis, the cycle can be followed through the protein restrictions of one, the carbohydrate restrictions of another, and the full diet of still another. The carbohydrate restrictions of Kelly and Palier are again reflected by those of Pemberton, and the full diet of Spender and Garrod is championed once more by Osler and Billings. In a critical review of rheumatic dietaries, there does not seem to be a diet for the disease, although there may be a definite diet for the patient with disease. In general, except in the obese, a high calorie anti-constipation diet seems to be indicated.

Autogenous vaccines are theoretically potent,

but are generally disappointing. However, if their specificity is fortified by positive results of animal experimentation, autogenous vaccines seem justified. Until a more specific form of treatment is afforded we believe that typhoid vaccine given intravenously in spite of its percentage of failures and unpleasant reactions gives justifiable results.

There is no specific medical treatment for chronic infectious arthritis. Salicylates reserve their brilliancy for rheumatic fever alone. However, analgesic medicines should be given fairly liberally, not only because the pain demands amelioration, but because of the psychotherapeutic effect. If the physician denies the patient medicine of some sort, a substitute in the form of one of the hundreds of rheumatism cures is usually obtained. Iodides and arsenic, our heritage from Garrod, will continue to be used sporadically. Hydrochloric acid and tonics will be indicated for the often associated achlorhydria and anemia. Intestinal antiseptics are ardently advocated by some.

In severe progressive cases in which all other measures fail, certain more radical procedures may be justified in the nature of experimental treatment. In a case at present under our observation, experimental malarial inoculation after the method used for tabes has been followed by definite increase of joint mobility (30° in some joints) and lessened pain. After four malarial paroxysms, they were stopped by quinine. In one desperate case distinct relief has been obtained by lumbar sympathectomy and ganglionectomy; this case will be more fully discussed later.

For the patient with arthritis much may be necessary in the way of painstaking elaboration of the nature of his illness, its relation to other rheumatic conditions to which he has erroneously compared his, the limitations and necessity for focal removal and also the need for an active and prolonged defensive program instituted by the physician but which must be carried out largely by himself. He will appreciate not only knowing what form of treatment he should patronize but what he should abjure. A sympathetic explanation of the basis of the cures into which he has been or will be introduced by anxious friends may restore his confidence in the greater safety and the more efficient inadequacies of recognized medical practice. For groups of patients individ-

ual consultations can be efficiently supplemented by group consultations in the form of lectures. In The Mayo Clinic each week three lectures are given: on the indications and contraindications for rheumatic dietaries, on the causes and treatment of the various forms of arthritis, and on the methods of application and the principles of formal and informal physiotherapy.

Specific Form.—The treatment here differs from that of the nonspecific form mainly in the care of the primary focus. For gonorrheal arthritis specific treatment of foci must be applied to the genito-urinary mucosa, supplemented by specific general treatment (gonorrheal vaccines). For the arthritis associated with psoriasis or with amebic, typhoidal or nonspecific ulcerative colitis, the respectively specific treatment is indicated and often alone seems to control or markedly benefit the condition of the joint. Physiotherapy and other supplementary measures mentioned should also be utilized.

TRAUMATIC ARTHRITIS

Traumatic arthritis, of extrinsic origin, is generally acute. The chronic forms result from the intrinsic trauma of obesity, of malposture or malposition. They are usually periarticular but may be hypertrophic. Static arthritis, associated with obesity, involves only the weight-bearing joints: the knees, lower lumbar spine and sacro-iliac joints and the subastragaloid joints of the feet. The hips seem to be adequately spared and protected against this abnormal trauma. Although there is an obvious endocrine or metabolic alteration which, coincident with the menopause, results in obesity, we believe that it is the obesity and not the endocrine change that here produces the arthritis; otherwise one would not expect it to confine its manifestations solely to the weight-bearing joints, or be relieved often by weight reduction alone.

Weight reduction to as nearly normal weight as possible would seem to be the prime object in treatment. Physiotherapy will give only palliative and restorative aid until the weight-bearing joints are again compensated by weight reduction. Simple orthopedic supports help to restore compensation, such as sacro-iliac support, orthopedic shoes for the pronation defect of the feet, and two-inch elastic bandages applied to the knees. Physiotherapy and supports without

weight reduction usually prove ineffective and give only temporary relief.

SENESCENT ARTHRITIS

The simpler forms of physiotherapy are generally useful. Removal of foci does not seem to influence it much. The slow rate of progression is often stopped spontaneously or uninfluenced by treatment. Such patients who consult their physicians do so mostly through fear of what might happen, not what has happened, fear that the mild condition may progress to more severe forms; once reassured they often go their way ignoring the palliation offered.

CHRONIC GOUTY ARTHRITIS

The main treatment is the diagnosis and separation of the condition from chronic infectious arthritis, as which it so often masquerades. The institution of Folin's high protein purin-free diet, with intermittent application of cinchophen and alkali, and with colchicum in the acute attacks, often controls the condition entirely. Typhoid vaccine intravenously has occasionally been of unusual aid in producing a remission during an otherwise uncontrolled acute exacerbation.

SURGICAL TREATMENT

The surgical treatment of the joints in chronic arthritis has to do with the residual deformities encountered in the late stages of the disease, and although rarely used in the earlier stages may be used as an eradicated measure, considering the joint as a focus of dissemination.

Surgical measures may be grouped under the following divisions: (1) so-called conservative measures, such as manipulation, brisement forcé, and so forth, usually with the employment of some fixative apparatus, such as a cast or a brace, to maintain the correction obtained; (2) arthrodesis, an operation reserved for the persistently painful joint, due to the destruction in the joint and not to the pain in the earlier stages; (3) synovectomy, an operation limited practically to the knee-joint; and (4) arthroplasty, an operation reserved for the bony ankylosis, when the fire of the disease has burned itself out and the residual deformities are due to bony ankylosis. Many times more than one, or even all, of these procedures may be applied to one patient at some time during the course of the disease. Physiotherapy in its various phases is a most valuable

adjunct to these surgical procedures and they go hand in hand.

Many patients come through a long siege of chronic arthritis with few deformities demanding attention. This is particularly true of the upper extremity, where considerable deformity is compatible with good function, as seen in the hands, partially flexed elbows, and more or less stiff shoulders. When the same degree of deformity exists in the lower extremities the patient is often prevented from earning a livelihood or enjoying the ordinary pursuits necessary to an enjoyable existence, and this is not because of pain, but because of a poor mechanism for locomotion. If these deformities fail to respond to the ordinary physiotherapeutic measures, then more radical measures are indicated. In some instances rest in bed with traction on the lower extremities will be sufficient to straighten flexed hips and knees. The aim must be to correct the deformity with the least possible trauma to the articular and periarticular structures, and thus retain the maximum of mobility. Some limbs will gradually straighten if put at rest in casts for a few days or a week, and at each change of cast a considerable degree of correction will be obtained. By applying a cast for correction of a flexed knee so that it is quite thick in the popliteal space after it is hardened, a transverse slit will permit of wedging it with either a special clamp or a piece of wood and gradually extending the leg, the front part of the cast over the patella acting as a sort of hinge. However, if the contracture is quite resistant, the patient should be anesthetized and force applied to break the adhesions. This force should be carefully applied and should be almost continuous, with slight relaxations, but not with violent movements as one would use a pump handle. Care must be taken not to cause fracture, for often the bones are markedly osteoporotic and needless tearing and injury must be avoided. It is better to manipulate at two or three sittings rather than injure the joint structures by one too vigorous effort, thus leading to more than necessary loss of motion. After the maximum of correction has been obtained, some form of fixation may be necessary to prevent the recurrence of the deformity, and either casts or splints should be applied. They should be left on only a few days before massage, heat and movements are used, thus preventing the formation of new adhesions. There is no

rule to follow; the length of time necessary to straighten an extremity will depend on the reaction of the tissues and the tenderness and soreness that follow the application of the force.

In chronic arthritis, arthrodiesis is rarely used, but when a certain joint, such as a knee or hip, stays persistently painful after all the other joints have quieted down, it may be best to stiffen it. Such an operation should be undertaken only after careful consideration, particularly if there seems to be any likelihood of further activity of the disease.

Synovectomy is applicable to only a few joints, and is practically confined to the knee-joint. When the synovia is so swollen and thickened that there is no possibility that it will subside to its normal condition, synovectomy in the knee-joint should be considered, and if undertaken at all it should be as complete as possible, including the semilunar cartilage. It is quite possible that such a synovia may serve as a focus for further dissemination of the infection. Movement should be started early after operation or the joint will again stiffen.

In certain cases after the arthritis has subsided, one or more ankylosed joints remain. The patient may be in excellent health but totally incapacitated by the bound joints. For patients in this pitiful condition arthroplasty, often performed on multiple joints, holds out a hope that is not to be lightly dismissed. Needless to say, the operation must be performed in good surroundings, by one skilled in the exacting technic. We have not hesitated to perform arthroplasty on both hips in the same patient, or one hip and one knee, both elbows, wrists, temporomaxillary joints, and so forth. These cases challenge surgery, and the challenge in the proper cases should be accepted. It is much better for the patients to get about by the aid of crutches or a cane than to be bedridden and useless with flexed hips or knees. Even arthroplasty on the fingers may be undertaken. When associated with these cases there is spondylitis deformans with bony ankylosis in the usual flexed position, the performing of any type of arthroplasty on the lower extremities is attended by mechanical difficulties so far as function is concerned; for even if the deformity is corrected, and satisfactory motion obtained by arthroplasty, the flexed spine so disturbs the normal line of weight-bearing that the new joint is of no use.

TABULATION

Type	Removal of foci	Elimination of trauma	Physiotherapy	Dietary restrictions	Vaccine		Medicaments			Educational
					Specific	Nonspecific	Specific curative	Nonspecific curative	Analgesic and tonic	
Chronic infectious	Radical	++	Intensive, prolonged, home and professional	- or +	+	+		+	+	+++
Traumatic	Conservative	+++	Until inactive	+*					+	+
Senescent	Conservative	+	Symptomatic		Can be used for pain				- or +	+
Gouty	Conservative	+	Symptomatic	+++	Can be used for pain		+		+	+++

*In static form.

Each patient demands special study and consideration. Surgical measures rightly considered and intelligently carried out offer to this group of patients, an army in themselves, hope of increased function and happier lives. In chronic conditions such as this, the medical profession must be continually on the alert and try any new procedure that offers any reasonable advantage over the old recognized forms of treatment. Apropos of this it seems justifiable to mention a most startling and encouraging result obtained by the bilateral removal of the second, third and fourth lumbar sympathetic ganglia in a case of chronic infectious arthritis of the progressive type. A woman aged thirty-five years came to the clinic presenting the characteristic picture of this chronic deforming atrophic arthritis. Since

the operation by Dr. A. W. Adson two years previously the condition in the lower extremities has not only been arrested but she is free of pain; the sweating and pallor have disappeared and the tissues have approached normal. She is able to walk without discomfort. In the upper extremities where ganglionectomy was not done the disease has steadily followed its chronic crippling course associated with severe pain. Recently the patient returned for operation on the cervical and dorsal sympathetic ganglia. This operation has given the same happy results as the one done for the lower extremities.

Although this is but a single case the brilliant result leads to speculation not only from the point of view of treatment but of etiology as well.

TUBERCULOSIS AND PREGNANCY*

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IN CONSIDERING the question of the relationship of pregnancy to tuberculosis three points arise: (1) that of the influence of the physiological function of the child-bearing on the patient; (2) the benefit to be derived by interruption of the pregnancy; and (3) the economic value of the child. In current literature much is being said concerning the good or evil to be expected by early interference, one school advocating early abortion in each case, discussing only the way it should be undertaken; the other allowing every pregnant tuberculous woman to go through pregnancy and deliver the child. Many are more conservative, believing each case should be a law unto itself and interference undertaken only in selected cases. These fairly well agree that the Turban I or II cases which show signs of progression of the disease under close observation or having a complication of laryngeal tuberculosis should be aborted and then only before the fourth month of pregnancy.

The belief held by many that the offspring of a tuberculous mother has a negligible chance of life or health favors the belief in early abortion. However, the results obtained by the immediate removal of the child from the mother have proven that these children have the same chance of health as a child born of healthy parents.

In regard to the first point, that of the effect of the pregnancy and delivery upon the tuberculous woman, there has been the least difference of opinion. Many who are opposed to interference agree that the effect on the mother may be serious but feel that the shock of the operation necessary for the abortion is of equal or greater danger and prefer to allow the pregnancy to take its course.

Bridgeman and Norwood¹ reported summaries upon 134 patients seen in the obstetrical service of the Johns Hopkins Hospital which were complicated by tuberculosis. Fifty of these patients had abnormal chest signs such as slight percussion changes, indefinite râles or modified breath-

ing, not sufficient for a positive diagnosis. The later histories of these women showed no active pulmonary condition. Of seventeen patients with definite but inactive tuberculosis at the time of delivery, ten were followed for a period of six to twelve years. Seven remained in excellent condition, one had reactivation of the pulmonary lesion one and two years after delivery, one had four subsequent deliveries, during which time the disease remained quiescent until eleven years later, when she went to a sanatorium. A third had a flare-up four years after delivery but when examined six years later was in good general condition. None of the ten patients had died. Thirty-one patients having active tuberculosis during pregnancy were reported. Of the twenty cases observed for a length of time sufficient to ascertain results, two (10 per cent) were improved, eight (40 per cent) were unimproved, and 10 (50 per cent) were dead one year after delivery.

In comparing these twenty tuberculous women with the complication of pregnancy with a group of seventy-two non-pregnant women in the Phipps Tuberculosis Clinic, a definitely unfavorable prognosis was found for the pregnant woman. However, a group of active pulmonary cases in which abortion was performed early in the pregnancy showed a higher percentage of deaths than the group which was allowed to deliver normally. These authors therefore state their belief that the risks of pregnancy are definitely increased by tuberculosis. When the two conditions are present, they advise to "treat the tuberculosis to the uttermost, and disregard the pregnancy."

Litzenberg² speaks of the apparent early improvement, found in many tuberculous women after conception. "She may put on fat and look and feel much better after conception, but this benefit is only apparent, is usually transitory and even in those women surviving the labor and puerperium, death is usually hastened—ultimately an untimely end occurs in a large percentage of cases."

*Read before the Inter-urban Academy of Medicine (of Duluth, Minn., and Superior, Wis.) at Nopeming, Minn., on May 16, 1928.

One hundred cases analyzed by Lobenstine³ of New York Lying-In Hospital showed an aggravation of the tuberculosis in every case. Stewart⁴ of Manitoba, in reporting 200 cases of tuberculous women with maternal histories, remarks, "The results are so definitely worse than the average that there may be a fair presumption of specific lack of resistance in tuberculous mothers—the conclusion cannot be avoided that childbirth has a definite place in the etiology of tuberculosis."

Forssner⁵ of Stockholm on the other hand believes that pregnancy is a negligible factor in the outcome of the disease. His report of 341 tuberculous women observed for two years following pregnancy as compared with the condition of 396 cases not having been pregnant show no graver consequences for the group of women in Turban I class. A somewhat poorer result was found among the pregnant women in the second and third stages of the disease, but "the difference is so slight that it might be simply the result of chance." He emphasizes the sociological and psychological handicaps such as poor food, extra stress and anxiety which act as factors in this connection rather than the physiological strain of pregnancy.

Professor Krause⁶ of Berlin observes that pregnancy and parturition are borne with less consequence by the tuberculous woman than is generally believed. Strassman⁷ of Berlin reports 102 women with prior pulmonary disease in ninety-six of whom the delivery was inconsequential.

A study has been made of the women patients entering Nopeming Sanatorium since 1912 to compare the outcome of the disease in those having maternal histories with those never having been pregnant. The total admissions up to May 15, 1928, numbered 2,761. Of these 1,473 were men, 346 children and 942 women. Thirty-one women were discharged as not tuberculous, leaving a total of 911 (32.9 per cent) women with active tuberculosis. Four hundred thirty-nine (47.2 per cent of the 911 cases) gave maternal histories while 422 (51.8 per cent) married and single women had not been pregnant.

The total number of deaths has been 1,432 (51 per cent). Of the 346 children admitted there have been 101 (29.1 per cent) deaths; of the 1,973 men patients, 807 (54.7 per cent) deaths. In the group of 439 women with ma-

ternal histories 271 (61.7 per cent) deaths have occurred while for the group of 422 women not having been pregnant there were 253 (53.8 per cent) deaths. From these figures it may be seen that the death rate in the women patients not complicated by pregnancy has been slightly lower than that of the men patients, while the group having tuberculosis either prior to their pregnancy or occurring during term or after delivery have approximately a ten per cent higher mortality than the other women.

A complete study of only 211 of these women has been possible as the chart histories of the remainder did not include the ages of the children. As may be seen by the accompanying table the cases have been grouped in relation to the time of the onset of the tuberculosis in regard to the pregnancy. As these were all sanatorium cases admitted on account of active tuberculosis we have not had the opportunity of observing cases of pre-existing disease unaffected by pregnancy and delivery.

Of the twelve cases developing tuberculosis before pregnancy seven have died. Four women had reactivation shortly after the first pregnancy, two immediately after the second child, having borne the first delivery well. One woman broke down after many pregnancies while four remained apparently well for several years before their disease became active. One patient in whom the disease spread rapidly became pregnant within two months after the first symptoms of tuberculosis. Five of the twelve patients developing tuberculosis during pregnancy were pregnant for the first time. Of this group 9 have died.

With such small figures definite conclusions cannot be drawn. However, it is interesting to note that those women who developed disease within a year or during pregnancy have had the highest mortality while those whose disease did not occur until several years after delivery have a death rate approximating the group with no maternal histories. There have been comparatively few deaths also in those women whose symptoms of tuberculosis developed after a spontaneous abortion or miscarriage. In the ten cases having symptoms of tuberculosis within one year after a miscarriage only one patient has died. These figures cannot be compared with the results following surgical abortions as there

TABLE I.

		Deaths	Percentage
Total Admissions	2761	1432	51.
Men patients	1473	807	54.7
Children	346	101	29.1
Women	942		
Not tuberculous	31		
Tuberculous women	911	528	57.6
Maternal histories	439	271	61.7
Women never pregnant	422	253	53.8

TABLE II

Time of development of tuberculosis symptoms.

Group	No.	Percentage	Deaths	Percentage
1 Before first pregnancy	12	5.6	7	58.3
2 During pregnancy	12	5.6	9	71.3
3 Two months after delivery	42	20	23	54.7
Two months after miscarriage	6	2.4	1	
4 Two months to one year after delivery	45	21.3	34	75.5
Two months to one year after miscarriage	4	1.8	0	
5 More than one year after delivery	88	41.2	42	53.4
More than one year after miscarriage	1			

Six patients in Group 3, one in Group 4, and twelve in Group 5 could not be traced after discharge from sanatorium.

have been no cases in which this has been undertaken. One patient admitted within the past year with a far advanced unilateral lesion complicated by recent spinal involvement became pregnant several months after the onset of the disease. She was admitted when two months pregnant. Surgical interference was discussed but after consultations held with an obstetrician and an orthopedic specialist it was decided that as the prognosis was poor the pregnancy be allowed to continue. A spontaneous abortion occurred a month later, since which time the patient has gained in weight and feels better, but the outlook remains poor.

A table of 211 of the 439 cases with maternal

histories whose histories gave the ages of the children is given above.

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SOME GREAT ARABIANS

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Saint Paul

WE who live in the noonday of Christianity are only dimly conscious of its less happy effects upon the world. The unearthly and beautiful religious light that shone in the first two centuries had, by the end of the third, acquired a resemblance to the torch of the destroyer, a torch that was applied without pity to a large legacy of Greek and Roman culture. In a crumbling empire, embers of pagan learning glowed fitfully, smoldering through the dark ages until fanned into fresh flame by the Renaissance. Today it seems clear that the victory of Charles Martel was two-edged, since much of the survival of the ancient culture, certainly much of its science, was the fault of the Saracen invader. That debt we owe to Mohammed and the Arabian adventure of the eighth and ninth centuries, not to the Christian Renaissance of the fourteenth. It is a point of some irony to consider our lack of gratitude for the conquering sword of the Prophet. While Christian Europe trembled at the advancing wave of the infidel and denounced the unbeliever, his hands gathered up and preserved the shattered culture of antiquity. Wondering Byzantium was astounded at barbarians whose victorious demands included a right to purchase Greek manuscripts.

Within the ninth century the Arabs, who in that space of time had made themselves masters of half of Europe, had also accomplished a far greater thing, a rebirth and indefatigable pursuit of Greek Philosophy and science. The opening years of the century saw them in possession of a handful of odd volumes; at its close innumerable works of the pagan world, done into Arabic, graced their libraries. In the north, that century as well as the following tenth saw the destruction of all the towns of France. The smoke of pillage marked the sky; churches and homes were deserted; the half-wild land was traversed by marauding bands and the people fled to the forests, hiding their very lives away. Paris was reduced to ashes while at Bagdad one could see in the Caliph's palace "a tree of gold and silver

spreading into eighteen large branches, on which, and on the lesser boughs, sat a variety of birds made of the same precious metals, as well as the leaves of the tree. While the machinery affected spontaneous motions the several birds warbled their natural harmony." That a nomadic and pastoral people should have accomplished so much in so short a time remains one of the marvels of the world. War had extended their empire from the Indus to the Atlantic ocean; its consolidation was achieved by an astounding multiplicity of intelligent effort. Mohammed wrote, "Science is the remedy for the infirmities of ignorance, a comforting beacon in the night of injustice. The study of the sciences has the value of a fast; the teaching of them has the value of prayer; in a noble heart they inspire the highest feelings and they correct and humanize the perverted."

Naturally, in such a scheme of things, medicine held a very high place. From the Koran comes the admonition, "He who has restored life to a man shall be accounted as if he had restored life to humanity." And again Mohammed, "God has not inflicted diseases upon us without at the same time giving us the remedy."

Under the wise rule of the Eastern Caliphates, Arabic desire for knowledge first found expression in transcriptions from the Greek. Schools of translators arose and a great body of Greek philosophy and science was rewritten into Arabic. Hunayn, biggest of them all, was a Christian Arab. Born in 809, he looms a romantic figure, inspired by the enthusiasm of a later Ghiberti or Donatello. Interested in medicine, he soon found that the road to knowledge lay through the Greeks. Disappearing from men he was one day seen in the streets of a far city by his former friend Yusuf who "one day saw a man with long hair and unclipped beard and moustaches reciting Homer in the street, and in spite of his changed appearance recognized his voice as that of Hunayn. He, being questioned, admitted his identity, but enjoined silence on Yusuf, saying that he had sworn not to continue his medical

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studies until he had perfected himself in the knowledge of the Greek language." This man, striding along the street reciting Homer, was of a piece with an age that built audience chambers encrusted with gold and pearls or sent its rulers into the field attended by a bodyguard of twelve thousand horse, their belts and cimeters studded with gold. He attained, finally, to high estate, becoming the Caliph's physician. Refusing, when first informed by the Caliph, to concoct a poison for one of his enemies, Hunayn was imprisoned for a year. Again brought before his ruler he was given a choice between concocting the poison or dying by the sword of the executioner. "I have a Lord," said Hunayn, "who will give me my right tomorrow in the Supreme uprising, so if the Caliph would injure his own soul, let him do so." Whereupon that prince took him into his own service, having designed this rather curious test to ascertain his physician's probity. Hunayn is remembered chiefly for his rendition of much of Hippocrates and Galen into Arabic.

In the wake of the translators there sprang up a group of original thinkers whose contributions to clinical medicine were of real and lasting value. There was Rhazes, perhaps the greatest of them all, who took his name from the town of his birth, a place near the present capital of Persia. Coming to Bagdad, he was educated there in the last half of the ninth century. This was still the Bagdad of the Arabian Nights, the wonder city of Haroun al Raschid, whose death was at that time a matter of contemporary knowledge. Beautiful and cruel, excessive both in its rewards and punishments, it was a city lit with the genius of an unfolding people. The very air was alive with a spirit of inquiry and in the streets splendor walked hand in hand with the sharp vigor and discipline of war. Haroun's answer to Rome's threat of battle, "Thou shalt not hear, thou shalt behold my reply," was not forgotten by a people who saw the accomplished desolation of the Phrygian plains. Rhazes may have seen the reigning Caliph Almamon who, during his nuptials, showered the head of his bride with a thousand pearls of the largest size. It was the same Caliph at whose command mathematicians, working in the plains of Sinaar, accurately measured one degree of the earth's circumference and whose vizier, inspired perhaps by his master, pledged 200,000 pieces of gold for the foundation of a college in the city. Amidst this general munifi-

cence, medicine was not forgotten. Haroun al Raschid's physician received 100,000 dirhams twice a year for bleeding his master and an equal sum for giving him a biennial purgative draught. It is estimated that in his twenty-three years of service at court he received the equivalent of more than seventeen million dollars. To this Utopian picture one cannot forego adding the magnificent gesture of another physician, who refused an invitation from the sultan of Bokhara because the transference of his library would have required the services of 400 camels.

Within this Bagdad of splendid turbulence the drama of Rhazes' life unfolded itself. They were practical, war-bitten men, these early Arabs, expecting results, excusing no failure. Esteeming medicine, they had little patience with its metaphysical side; for them illness demanded relief or cure. The translators had in the end done little more than open the printed book, and words had been found not to be deeds. This practical challenge was ably met by Rhazes. There is, indeed, a story of his later life that shows us, not without humor, how much of challenge he did, upon occasion, offer life. Summoned to Transoxiana by the Amir Mansur, who was suffering from rheumatism, he found it necessary to cross the swollen Oxus on the way. Deterred by the fragile boat and the angry width of the stream, the attendants were obliged to bind him, thus carrying Rhazes across by force. Arrived at Bokhara he tried, unsuccessfully for a time, to treat the Amir. Finally he demanded the best horse and mule in Mansur's stables in return for a new treatment. He then took the Amir outside the city to a hot bath, while horse and mule, saddled, waited nearby. After manipulating his patient in the hot bath for a time he retired to dress, returning robed and with a knife in his hand. Standing over Mansur he threatened him with his life saying, "Thou didst order me to be bound and cast into the boat and didst conspire against my life." The enraged and half frightened Amir sprang to his feet, calling his servants. Rhazes, however, seizing upon the confusion of the moment, fled on his bridled horse, nor did he stop until he had recrossed the Oxus and felt himself in territorial safety. There arrived he wrote Mansur the following letter, "May the life of the King be prolonged in health and authority! Agreeably to my undertaking I treated you to the best of my ability. There was,

however, a deficiency in the natural caloric, and this treatment would have been unduly protracted, so I abandoned it in favour of psychotherapeutics, and, when the peccant humours had undergone sufficient coction in the bath, I deliberately provoked you in order to increase the natural caloric, which thus gained sufficient strength to dissolve the already softened humours. But henceforth it is inexpedient that we should meet." The Amir, cured by the bath and his unwonted activity, conferred upon the astute physician a yearly pension of 2000 gold dinars as well as 200 ass loads of corn. Of his early life we know only that he was an accomplished player on the lute and that he had little use for metaphysics. His interest in medicine was aroused by a dispenser of drugs at one of the hospitals in Bagdad. After a rapid rise, he subsequently became physician-in-chief to Bagdad's great hospital, about the building of which he was consulted. His choice of a site was the outcome of an original and ingenious experiment. He caused pieces of meat to be hung up in various quarters of the city, finally building on the spot where the exposed meat decomposed most slowly. His excellent clinical observation undoubtedly owes much to the interdependence of schools of medicine and hospitals throughout Islam. Such schools, connected with hospital teaching, existed in Bagdad, Damascus, Cairo, and Cordova from the ninth to the fifteenth centuries. There were specialized wards for accident, eye and fever cases, to which attending physicians were assigned cases, according to their specialty. Such advance as the Arabs made was restricted to clinical medicine and pharmacology, anatomy and physiology suffering because of the teachings of the Koran, which forbade dissection. The high level of hospital care is illustrated by the following anecdote.

"In the year 831 (A. D. 1427) I came to Damascus. With me was a gentleman of Persian origin, a man of talent and taste, and of great intelligence. This year he made a pilgrimage to Mecca. When he entered this hospital and saw the food distributed there, as well as all the conveniences and luxuries that were there enjoyed by the patients, he conceived the idea of remaining there, pretending that he was sick, and he did remain for three days. The physician, having come to him in order to ascertain the nature of his disease, and having felt his pulse, at once recognized the real condition of affairs and ordered him to eat the foods that gave him the most pleasure, such as tender chickens, jams, sherbets, and all kinds of choice fruit. The three days having elapsed he (the physician) wrote out

a prescription to the effect that a guest should not remain longer with a host who had accorded him three days' hospitality."

At Bagdad Rhazes surrounded himself with students, conducting his bedside teaching very much in the modern manner. His is the first clinical account of smallpox, to the description of which nothing of importance has since been added. It is interesting to note that he did not consider the fever itself as a disease, but rather an expression on the part of nature to find a solution for the disease. His writings were voluminous and many are as yet not available in translation. One of the volumes concerns clinical notes and is entitled "Illustrative accounts of patients, and narratives of unusual cases about which we were doubtful." Because of its acuity, one of these cases is quoted.

"Abdullah ibn Sawada used to suffer from attacks of mixed fever, sometimes quotidian, sometimes tertian, sometimes quartan, and sometimes recurring once in six days. These attacks were preceded by a slight rigor, and micturition was very frequent. I gave it as my opinion that either these accesses of fever would turn into quartan, or that there was ulceration of the kidneys. Only a short while elapsed ere the patient passed pus in his urine. I thereupon informed him that these feverish attacks would not recur, and so it was.

"The only thing which prevented me at first from giving it as my definite opinion that the patient was suffering from ulceration of the kidneys was that he had previously suffered from tertian and other mixed types of fever, and this to some extent confirmed my suspicion that this mixed fever might be from inflammatory processes which would tend to become quartan when they waxed stronger.

"Moreover the patient did not complain to me that his loins felt like a weight depending from him when he stood up; and I neglected to ask him about this. The frequent micturition also should have strengthened my suspicion of ulceration of the kidneys, but I did not know that his father suffered from weakness of the bladder. So when he passed the pus I administered to him diuretics until the urine became free from pus, after which I treated him with *Terra sigillata*, *Boswellia thurifera*, and *Dragon's Blood*, and his sickness departed from him, and he was quickly and completely cured in about two months. That the ulceration was slight was indicated to me by the fact that he did not complain to me at first of weight in the loins. After he had passed pus, however, I inquired of him whether he had experienced this symptom, and he replied in the affirmative. Had the ulceration been extensive, he would of his own accord have complained of this symptom. And that the pus was evacuated quickly indicated a limited ulceration. The other physicians whom he consulted besides myself, however, did not

understand the case at all, even after the patient had passed pus in his urine."

In the field of pharmacology, though the use of drugs was empirical, experimental trial of them left little to be desired. Wishing to test for himself the reputed toxicity of mercury, the practical Rhazes gave some to a monkey, recording the experiment as follows:

"As to pure mercury, I believe it not to be very pernicious; it gives rise to intense abdominal and intestinal pain, but afterwards leaves the body as it entered it, especially if the subject takes exercise. I gave it to a monkey that I had at my house and things passed as I have said. I noted that he twisted himself about, clenched his teeth, and pressed upon his belly with his hands. Calomel, and especially sublimate, are very dangerous and very active poisons. They cause very sharp abdominal pains, colic and bloody stools. The emanations of mercury give rise to paralysis."

In addition to his own writings, semipopular tales concerning Rhazes abound. Though hardly scientific, they convey a taste of the age, thus:

"A young man of Bagdad came to Rhazes complaining of Hæmatemesis. Careful examination failed to reveal the cause or explain the symptom. The patient was in despair, believing that where Rhazes failed, none could succeed. Rhazes, touched alike by his distress and his faith, then proceeded to question him very carefully as to the water he had drunk on his journey, and ascertained that in some cases it had been drawn from stagnant ponds. 'When I come tomorrow,' said he to the patient, 'I will treat you, and not leave you until you are cured, on condition that you will order your servants to obey me in all that I command them concerning thee.' The patient gave the required promise, and Rhazes returned next day with two vessels filled with a water-weed called in Arabic, Ruhlub, and in Persian, Jama-i-Ghuk (Frog's coat) or Pash-i-Wazagh (Frog's wool) which he ordered the patient to swallow. The patient, having swallowed a considerable quantity, declared himself unable to take any more, whereupon Rhazes ordered the servants to hold him on his back on the ground and open his mouth, into which he continued to cram more and more of the nauseous substance until violent vomiting ensued. Examination of the vomit revealed a leech which was the source of the trouble, and with the expulsion of which the patient regained his health."

Becoming blind toward the end of his life, Rhazes refused an operation for cataract on the ground that he wished to see no more of a world with which he was disgusted and disillusioned. Whether this was philosophic resignation or fear of the surgery of his day one will never know. His intelligence suggests the latter and his mind may have dwelt rather uncomfortably on an apt Arabian verse, which runs,

"The physician says to thee, 'I can cure thee,'
When he feels thy wrist and thy arm;
But did the physician know a cure for disease
Which would ward off death, he would not himself
suffer the death agony."

The so-called Prince of the Arabians was Avicenna. He was born about 980 near Bokhara in the province of Khorasan. At ten years of age he had memorized the Koran, at twelve he knew mathematics, metaphysics and law. His famous contribution to medicine is the Canon, which remained, as Osler says, "A medical bible for a longer period than any other work." It represents the final codification of Græco-Arabic medicine. The feat of unifying Greek medical legacy with Arabic observation was prodigious and marks Avicenna as a really unusual as well as indefatigable mind.

His description of nervous diseases is remarkable, as witness for example his definition of meningitis:

"Acute sersam is an inflammation or tumor of the envelopes of the brain. The prodromata of this disease consist of headache, disturbed sleep and mental depression without cause. As soon as the process becomes localized in the meninges, the first symptoms developing are restlessness, violent headache and pain in the neck. Occasionally there is epistaxis and slight incontinence of urine. When the disease has fully developed all hope of cure is vain. There is intense fever and mental depression and the patient remains perfectly silent and indifferent to what is said to him. Respiration is rapid and irregular; the thoracic movements are, however, ample and deep; localized or generalized convulsions occur; sleep is disturbed and accompanied by extreme restlessness and hallucinations, the patient cries out and is unable to bear light."

"At the terminal phase of the disease, the tongue becomes paralysed and insensibility is general; if the patient be touched with a (pointed?) instrument, even with considerable pressure, he feels nothing; finally the limbs become cold and the patient dies from asphyxia."

Pleurisy, pyloric stenosis, pneumonia and gastric ulcer all are described. He clearly points out the food-pain relationship in ulcer and in considering a differential diagnosis of pleurisy he mentions abscess of the liver, mediastinitis and intercostal affections. The extrinsic muscles of the eye were known to him as were also the lacrimal ducts. He explains the convolutions of the intestine as follows:

"It is to have food remain the proper time in the gut in order that the nutritive material may have sufficient time to become separated from the useless matter. If a man had but a single intestine the food would

be ejected too quickly and he would be obliged to take food all the time."

His knowledge of psychiatry was far from negligible. Love is classed under mental disease, the wily Arab making the following comment upon it:

"And hereby it is possible to arrive at the identity of the beloved person, if the patient will not reveal it, such knowledge affording one means of treatment. The device whereby this may be effected is that many names should be mentioned and repeated while the finger is retained on the pulse, and when it becomes very irregular and almost ceases, one should then repeat the process. I have tried this method repeatedly, and have discovered the name of the beloved. Then, in like manner, mention the streets, dwellings, arts, crafts, families and countries, joining each one with the name of the beloved, and all the time feeling the pulse, so that when it alters on the mention of any one thing several times, you will infer from this all particulars about the beloved as regards name, appearance and occupation. We have ourselves tried this plan, and have thereby arrived at knowledge which was valuable. Then, if you can discover no cure except to unite the two in such wise as is sanctioned by religion, and law, you will do this. We have seen cases where health and strength were completely restored and flesh regained, after the patient had become greatly attenuated and suffered from severe chronic diseases and protracted accesses of fever from lack of strength resulting from excessive love, when he was accorded union with his beloved . . . in a very short time, so that we were astonished thereat and realized the subordination of (human) nature to mental imaginations."

There is extant also an account of his treatment of melancholia.

"A certain prince of the House of Buwayh was afflicted with melancholia and suffered from the delusion that he was a cow. Every day he would low like a cow, causing annoyance to every one, and crying, 'Kill me, so that a good stew may be prepared from my flesh'; until matters reached such a pass that he would eat nothing, while the physicians were unable to do him any good.

"Finally Avicenna, who was at this time acting as prime minister to Alaud-Dawla ibn Kakuya, was persuaded to take the case in hand, which in spite of the pressure of public and private business, political, scientific and literary, with which he was overwhelmed, he consented to do. First of all he sent a message to the patient bidding him to be of good cheer because the butcher was coming to slaughter him, whereat, we are told, the sick man rejoiced. Some time afterwards, Avicenna, holding a knife in his hand, entered the sickroom saying, 'Where is this cow, that I may kill it?' The patient lowed like a cow to indicate where he was. By Avicenna's orders he was laid on the ground bound hand and foot. Avicenna then felt him all over and said, 'He is too lean, and not ready to be killed; he must be fattened.' Then they offered him suitable food, of which he now partook eagerly, and

gradually he gained strength, got rid of his delusion, and was completely cured."

Such was Avicenna. More prolific, more various than Rhazes, he occupied a higher place in Arabian medicine though, perhaps, not altogether deservedly.

The greatest surgeon of the Arab world flourished at Cordova in the tenth century. He wrote a treatise summing up the surgical knowledge of his times which was for a long time a classic. It was rich with illustrations of instruments and became a favorite in later medieval schools. The success of Albucasis may be explained by a quotation from him to the effect that:

"The reason why skillful operators do not exist today is that the art of medicine requires time (to learn); he who would practise (surgery) should first study anatomy as given by Galen, in order to know the functions of the organs, their shape, their temperament, their relationship (to other organs), and to know the bones, tendons and muscles, their number and position, also that of the veins and arteries, as well as the regions through which they pass.

"If anatomical knowledge be ignored, mistakes will be made and the patient will be killed."

He was the first to give precise indications for the use of the cautery. For success in operating on abscess of the liver he insists on the necessity of having adhesions between liver and peritoneum since pus will otherwise escape into the abdominal cavity and cause certain death. Dealing with goiter more thoroughly than any of his predecessors he clearly differentiates cancer of the thyroid from ordinary enlargement, stating that the former is incurable and that the latter should only be operated when it presents a small, soft tumor. Albucasis was the first to describe vaginal lithotomy; he successfully performed tracheotomy and advised against operation in hydrocephalus, saying that such children operated on by him all died. In obstetrics he employed craniotomy for large fetal heads. While discussing the treatment for uterine abscess he incidentally draws a clear picture of the speculum and its use.

With this brief glimpse at Arabian surgery one is obliged to make an end. But in so doing, a final anecdote needs telling. The impact of the crusades produced curious contacts between Islam and Christianity, sometimes rarely curious in the field of medicine. Between the eleventh and fourteenth centuries the nobility of Europe slowly acquired the habit of Saracen physicians. That it was an excellent habit the following

memoir of Thabit, a Syrian physician writing in about 1140 A. D., clearly indicates.

"They brought to me a knight with an abscess in his leg, and a woman troubled with fever. I applied to the knight a little cataplasm; his abscess opened and took a favorable turn. As for the woman, I forbade her to eat certain foods, and I lowered her temperature. I was there when a Frankish doctor arrived, who said, 'This man can't cure them!' Then, addressing the knight, he asked, 'Which do you prefer, to live with a single leg, or to die with both of your legs?' 'I prefer,' replied the knight, 'to live with a single leg.' 'Then bring,' said the doctor, 'a strong knight with a sharp axe.' The knight and axe were not slow in coming. I was present. The doctor stretched the leg of the patient on a block of wood, and then said to the knight, 'Cut off his leg with the axe, detach it with a single blow.' Under my eyes, the knight gave a violent blow, but it did not cut the leg

off. He gave the unfortunate man a second blow, which caused the marrow to flow from the bone, and the patient died immediately.

"As for the woman, the doctor examined her and said, 'She is a woman with a devil in her head, by which she is possessed. Shave her hair.' They did so, and she began to eat again, like her compatriots, garlic and mustard. Her fever grew worse. The doctor then said, 'The devil has gone into her head.' Seizing the razor he cut into her head in the form of a cross and excoriated the skin in the middle so deeply that the bones were uncovered. Then he rubbed her head with salt. The woman, in her turn, expired immediately. After asking them if my services were still needed, and after receiving a negative answer, I returned, having learned from their medicine matters of which I had previously been ignorant."

And with the gentle irony of that last sentence still in mind we do, finally, make an end.

CASE REPORTS

CONGENITAL SOLITARY KIDNEY

A Résumé with Report of Case Complicated by Ureteral Stricture

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The urogenital tract is especially subject to various interesting congenital abnormalities. Among these, congenital single kidney or congenital agenesis, an anomaly of number, is characterized by complete absence of the kidney on one side or the other. It is not to be confused with unilateral fusion nor congenital aplasia which, while occurring much more frequently, is a degenerative anomaly.

ETIOLOGY

Complete failure in development of the renal bulb at the base of the Wolffian duct is characterized by entire absence of kidney, ureter, ureteral orifice and ureteral ridge (Fig. 1, A).

Degenerative forms sometimes occur, showing a stump of the ureter with a well-formed ureteral orifice and ridge (Fig. 1, B and C). Associated with this condition are frequently found other anomalies of the urinary and genital tracts in either male or female and these are often isilateral with the renal agenesis.

OCCURRENCE

According to autopsy reports solitary kidney occurs approximately once in 1,600 cases. The literature, however, is very meager in reference to this important condition, less than 400 reported cases being on record.

It seems more frequent in males, although more autopsies are done on male patients.

Bilateral aplasia is of course inconsistent with life so we find the age incidence of single kidney directly dependent upon two factors: (1) Extent of other associated anomalies; (2) nature and extent of disease present in the single kidney, and its resultant effect on life.

The remaining kidney may be normal in location (Fig. 1, A, B and C), may be in a crossed position (Fig. 2, B), in the median line (Fig. 2, C), or pelvic ectopic (Fig. 2, D), similar to the case here reported.

The single kidney is almost invariably enlarged to accommodate the additional function; hence, an enlarged kidney on one side or other should always lead us to suspect the possibility of a single kidney.

A single ureter as in Figure 1, A, B, and C is the rule, usually associated with a dilated pelvis to accommodate the hypertrophic and hyperfunctioning organ. A single ureter crossed to the opposite side of the bladder is sometimes found, as in Figure 2, B.

Double ureters may exist, as in Figure 2, A. In this case, however, both ureters open on the same side.

The left side is most commonly involved, for unknown reasons.

Renal vessels are usually absent but presence of renal vessels indicates a degenerative condition.

An adrenal may occasionally be present with the kidney absent.

SYMPTOMATOLOGY

The condition may be entirely symptomless; hence, proven cases are reported from autopsy reports unless disease has intervened in the single kidney and called attention to the urinary tract. Some cases, too, are discovered in the course of a routine urological survey.

Without a definite characteristic symptom-complex, therefore, these cases may go on to lead an apparently normal and healthy existence until disease in the kidney itself, disease elsewhere in the body or other untoward factors bring the condition to light.

It is a significant fact that all anomalies of the urinary tract lead to pathological change and this is particularly true here where a double function must be performed by a single organ. Eisendrath has cited a number of cases of anuria in previously unsuspected cases of solitary kidney. This is not surprising in view of the fact that in close to 400 recorded cases of solitary kidney, uremia was listed as the cause of death in 33 per cent. The solitary kidney is subject in a greater degree to the same pathological changes as the bilateral kidneys.

DIAGNOSIS

Inasmuch as most of the recorded cases are from autopsy reports and in view of the lack of definite symptoms, the clinical presence of solitary kidney is usually recognized only in the course of a complete urological survey.

Careful inspection of the bladder with special reference to the trigone and ureteral orifices, ureteral catheterization, color and function tests and complete urography are necessary in order to make the diagnosis.

Cases of solitary kidney have often had operations performed on various organs—gall bladder, appendix, kidney, ureter, prostate, bladder, etc., frequently with disastrous results. Ransohoff has even recorded a number of cases of nephrectomy of solitary kidney.

It should therefore be more appreciated that a man doing general surgery should be fortified by at least a fair knowledge of anomalies of the urinary tract.

In differential diagnosis, we must exclude renal aplasia or incomplete development, which is fully as important but occurs four times more frequently. Occurred renal tuberculosis and renal fusion are also to be excluded in the urological survey.

Medically, the condition is also of great importance, particularly in those patients suffering from kidney symptoms.

CASE REPORT

H. B., a Russian farmer aged 48, was admitted to the hospital March 3, 1926.

Family History—Father died at 78, mother at 73. One sister died at 40, cause unknown.

Previous Diseases—Rheumatic fever four years ago.

and had the consistency of a cyst rather than an inflammatory mass.

The rectum and genitalia were essentially negative.

The patient's temperature, blood hemoglobin and cell counts, Wassermann and fractional test meals all were of negative value. The urine contained occasional pus cells and granular casts. The phenolsulphonephthalein was 40 per cent in two hours. The blood urea was 78 mg. per 100 c.c.

Cystoscopy was performed under sacral anesthesia.



Fig. 1. A, Absence of kidney, ureter and ureteric orifice. Asymmetric trigone. B, absence of kidney but rudimentary ureter with normally placed and formed ureteric orifice and asymmetric trigone. C, same as B, but with rudimentary renal artery.

Complaint.—The patient complained of pain in the right lower quadrant. For the past twelve years nocturia had been present one to three times a night. The past four weeks urgency day and night had been present and the past three weeks burning and halting urination had caused discomfort. There had been upper abdominal distress at irregular intervals associated with belching of gas during the past three years. A dull pain had occurred occasionally in the right lower abdominal quadrant during the past year which seemed worse the last four weeks. The bowels had been constipated, more so the past month. The appetite had been good, there had been no quality or quantity distress, no nausea, vomiting nor disability.

The patient was referred for appendectomy on account of abdominal distress and right lower abdominal pain.

Examination.—The patient was a well developed and nourished male weighing 151 pounds. Considerable dental caries was present. The heart and lungs were apparently normal. The blood pressure was 148-112; the pulse 72.

The abdomen was moderately distended and there was a definite rigidity of the right lower quadrant. In the latter region a definite mass was palpable and tender

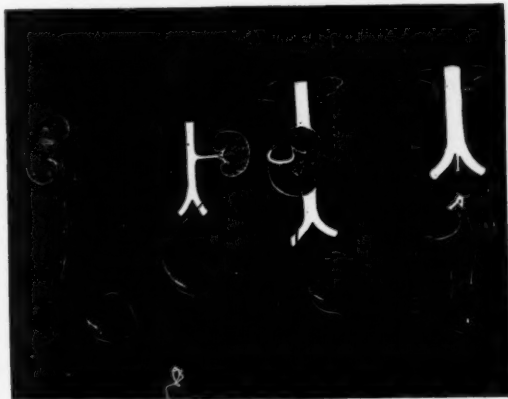


Fig. 2. A, solitary kidney with reduplication of ureters. B, solitary kidney in crossed ectopia position. C, solitary kidney in median line. D, solitary ectopic (pelvic) kidney.

The trigone was asymmetric and there was an absence of the left ureteral ridge and orifice. On catheterizing the right ureter, an apparent stricture was encountered in the lower end of the ureter 3 cm. from the orifice. A No. 7 catheter was passed to the kidney pelvis and a hydronephrosis demonstrated by aspirating 30 c.c. of clear urine. The stricture was dilated to 3 mm. On administering indigocarmine intravenously there was no evidence of other ureteral orifice in the bladder or urethra.

Two days later the kidney function test was repeated and there was no evidence of other ureteral opening.

Urograms.—A large right-sided pelvic ectopic kidney was shown with the upper pole extending to the top of the third lumbar vertebra. Moderate hydronephrosis was present in the large kidney with marked clubbing of the major calices with disappearance of all minor calices. The ureter was slightly tortuous and greatly enlarged in its downward course, with a very marked hydroureter in its terminal portion. There was no evidence of kidney tissue on the left side.

The patient was reexamined a week later, with repetition of color and function tests, with the same results as before. Asymmetry of bladder was very definite. The right ureter was dilated to 4 mm. and the patient much improved.

March 29, 1926. Patient greatly improved generally.

Re-cystoscopy with uniformly the same results as previously.

March 30, 1927. Same as March 29, 1926.

July 11, 1928. Patient complains of slight epigastric distress with occasional nausea. Re-cystoscopy and patient discharged much improved.

The urographic data in this case are so clear-cut and



Fig. 3.

decisive that I have no hesitancy in making a pre-autopsy diagnosis of congenital solitary kidney complicated by ureteral stricture.

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MIGRAINE AND EPILEPSY Two Case Reports

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Migraine and epilepsy present many features in common, and it is generally believed that a definite interrelationship exists. The history of migraine and epilepsy in the same family or descendants, the periodicity of the attacks, and the occurrence of both migraine and epilepsy in the same individual are among the common characteristics. Alcoholic stimulants even in small amounts have a tendency to increase the frequency and severity of both disorders. Occasionally epileptic seizures are ushered in by typical migrainous attacks. The following two cases present some of these features:

The first case is that of a boy, aged 14, referred to us by Dr. A. Schwyzer, February 25, 1929. The family history is negative except that the maternal grandmother and the mother suffered from migraine. The patient's birth and developmental history is normal. He has had no acute illnesses except influenza at the age of eleven years. He is in the eighth grade in school.

Since his second year, patient has had headaches, unilateral in character, accompanied by "black specks in front of his eyes," of twenty-four to forty-eight hours' duration and associated with nausea and vomiting. These would occur from one to six times a month and were frequently preceded by a period of twenty-four hours during which his appetite was ravenous. They continued until about one year ago. Since then the headaches have been less, both in frequency and severity.

About eighteen months ago he began to notice that in school while writing his right hand would jerk involuntarily and in the direction of the line of his script. There was no cramping of the muscles nor would he drop his pen or pencil. Along with this jerking he would "lose himself for a moment and have difficulty in thinking." These attacks would occur only when he paused in his writing to think of what he was going to put down next. They manifested themselves about twice a week. On February 24th he had a ravenous appetite. On the morning of February 25th while in school he had a generalized convulsion associated with unconsciousness and frothing at the mouth. He remained unconscious for about one hour, complained of a bitemporal headache on awakening, slept the greater part of the day, and in the evening had an attack of emesis. He felt well the following morning. Dr. Harry Ghent saw him immediately after his convulsion and made a diagnosis of essential epilepsy. The neurological and physical examinations were negative throughout. Hemoglobin 82 per cent; blood pressure, systolic 104, diastolic 68; urine normal. A diagnosis of migraine and essential epilepsy was made and the patient placed on luminal and a proteid-restricted diet with limited amounts.

The interesting features in this case are the familial history of migraine, the early onset of migraine in the

patient—two years of age—the gradual manifestations of petit mal, and finally the grand mal attack, followed by an improvement in his periodic headaches.

The second case is a woman, aged 24 years, referred to us by Dr. F. J. Schatz, St. Cloud, Minnesota, July 11, 1928.

Her family history is negative except that one sister suffered from migraine.

Her personal history is negative throughout. The menstrual periods are normal but irregular.

At the age of twenty-two years she began to have headaches. The headache would be preceded for several hours by a "sick feeling" in her head. The pain then would begin in either the right or the left eye, increase in severity and become so intense that she would be compelled to go to bed. It would gradually extend over the head but always remained unilateral, either right or left. This would be associated with nausea, vomiting, photophobia, and occasionally with scotomata. These symptoms would continue from one to five days, and sometime during the course of the headache she would have a generalized convulsion, would be unconscious for several minutes, and this would always be followed by emesis. At first these attacks occurred every two or three weeks but during the past four months, several times a week. She had

lost twenty pounds in weight during the past six months.

The physical and neurological examinations were negative throughout. The cranial nerves, fundi, reflexes, and sensation were normal. Her hemoglobin was 70 per cent; red blood cells 3,700,000, leukocytes 5,200; blood pressure, systolic 102, diastolic 70. Blood Wassermann negative; spinal fluid, moderately increased pressure, clear, 1 cell, globulin a trace, Wassermann negative, colloidal gold test, 0111000000. Basal metabolic rate minus 10.

A diagnosis of migraine with epilepsy was made. The patient was given luminal and calcium lactate and a proteid-restricted diet. She furthermore was given a course of sodium bicarbonate intravenously. Following this course of treatment she remained free from headaches and convulsions for two months. After this they recurred in spite of the fact that she was still taking luminal and calcium lactate.

It is difficult to state whether her migrainous attack was an aura preceding the major convulsion or a true migraine. Her description of the headache, however, is typical of a migraine, and in all probability we were dealing with two definite disorders.

538 Lowry Bldg.

PRESIDENT'S LETTER



THE CONSULTATION BUREAU

AT THE Secretary's conference held at Saint Paul last month, a vast deal of material was presented fraught with much of value to our profession and our patients. To our way of thinking the report of Dr. Pearce's committee on the Consultation Bureau was an outstanding feature. This, in brief, makes it possible for any member of the State Society having a problem in diagnosis or treatment to submit to this bureau any statement regarding the case, together with a request that it be submitted to competent specialists for solution and suggestions as to further procedure. In fact, virtually a long distance consultation. This may be done by mail, or, in the event of urgency, by night letter or telegram. The whole matter is to be treated in a strictly confidential way, only the substance of the communication, without reference to name of the physician making the request, being referred by the bureau.

It is contemplated that this service shall be most expeditious, answers to requests being returned the same day they are received and by wire if so requested.

Applications should be sent direct to the office of the Secretary, who in turn will transmit them to the Consultation Bureau. This bureau will consist of Dr. N. O. Pearce, pediatricist, of Minneapolis; Dr. E. M. Hammes, neurologist, of St. Paul; Dr. F. J. Hirschboeck, internist, Duluth; Dr. G. E. Brown, internist, Rochester; with Dr. W. A. O'Brien, Assistant Professor of Pathology in the University Medical College, in direct charge. Dr. O'Brien's broad and varied knowledge, together with his wide acquaintance, will enable him to bring to his assistance in the shortest possible time all available authority on any given problem. We anticipate a ready response for this service and offer congratulations to Dr. Pearce on the fulfillment of a long cherished ambition.



EDITORIAL

MINNESOTA MEDICINE

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RABIES

Shall Minnesota return to the days of 1914, in which year in Minneapolis alone there were an average of five rabid dogs per week during the first seven months of the year?

Prior to December, 1920, rabies had been continuously present in this State for a period of twenty-five years. Heavy losses of domestic animals other than dogs had been sustained and not less than 18 persons' had lost their lives. Much expense was involved in securing preventive treatment of bitten persons. In one instance between twenty-five and thirty persons of one small village, approximately 10 per cent of its population, underwent treatment at a private Pasteur

Institute in Chicago. By legislative enactment Pasteur treatment was furnished free to Minnesota residents in 1907. Over 1800 persons received antirabic treatment between 1907 and 1921 when by legislative act, on recommendation of the State Board of Health, this work ceased.

There was no rabies in Minnesota from December, 1920, to December, 1925, when it was introduced into Traverse County in all probability from South Dakota. Prompt action of the State Live Stock Sanitary Board in tracing contacts and imposing restrictions on dogs resulted in stamping out the disease by May, 1926, but not until it had invaded three additional counties.

In the autumn of 1927 an outbreak of rabies occurred in sparsely settled Lake County along the lake shore drive. It remained unrecognized until late in December. Then in spite of prompt action by the Live Stock Sanitary Board it apparently spread to St. Louis, Itasca and Carlton Counties in 1928. Rabies has since appeared in Chisago, Ramsey, Washington and Clay Counties. One outbreak in Ramsey County was in a dog brought in from Omaha, Nebraska. It has been necessary for at least twenty-four persons of this State to receive antirabic treatment during 1928.

Withal it is surprising that Minnesota has had so little rabies since 1920, for during the past few years the disease has been on the increase throughout the country. Reports indicate that no state has escaped rabies at some time during the past two years. Incomplete reports show that at least sixty-eight persons and 1,600 lower animals succumbed to rabies in the United States during 1928.

The enormous increase in tourist traffic with a proportionate increase in out-of-state dogs on the running boards makes the rabies problem increasingly serious.

Through the judicious restriction of the dog, rabies has been banished from Sweden, England, Ireland, Holland and kept from entering Australia and New Zealand. Restrictive measures have held this disease at low ebb over long periods in certain other European countries, in Canada and in parts of the United States.

The State Live Stock Sanitary Board, under

which control of rabies in lower animals falls, up to the present legislative session has been limited to placing restrictions on dogs in localities located within a twenty-five mile radius of the sanitary district in which a case of rabies occurs. When it is known that the rabid dog in the infectious stage may travel on his own legs a distance of fifty to one hundred miles biting persons, dogs, and other domestic animals along his trail, it is obvious that such limited powers for control are inadequate. A show dog en route from Seattle to Toledo died and was removed from the train at St. Paul. Examination showed that this dog had died of rabies. This dog had bitten three express men along the journey.

Because of the known facts relating to the spread of rabies and its successful control our present legislature has wisely passed a bill which gives the Sanitary Board power to extend protection, through restrictions of dogs, to such communities beyond the twenty-five mile limit as the Board may deem peculiarly endangered.

Such facts further indicate the desirability for further action leading to uniform State Laws for the control of rabies and the rigid enforcement of same.

O. McDANIEL, M.D.

EARLY DIAGNOSIS OF TUBERCULOSIS

April is the month which has been designated this year by the National Tuberculosis Association to call special attention to the importance of early diagnosis of tuberculosis. Last year it was March. This year the early diagnosis of glandular tuberculosis in children is being particularly stressed.

In an editorial last month we pointed out the need for more activities directed towards the prevention of tuberculosis in adolescent girls particularly. We are glad to aid in the national campaign which is being undertaken this month not only by the National Tuberculosis Association but by the state, county and city tuberculosis groups. The Minnesota Public Health Association is conducting tuberculosis activities in our state and will send out pamphlets to members of the profession emphasizing the importance of early diagnosis of the disease, as was done last year. Two post-graduate courses, one at Lymanhurst and the other at the State Sanatorium (announced elsewhere in this issue) will be a part of the cam-

paign. The leading article in this issue by Dr. J. A. Myers, president of the Minnesota Public Health Association, emphasizes certain points of importance in the early diagnosis of tuberculosis.

Certain facts regarding tuberculosis have been fairly well established. Tuberculosis is an infection, is commonly contracted in infancy or childhood when hilus tuberculosis is likely to follow healing of a primary focus in one of the lower lobes of the lungs. Also, active pulmonary tuberculosis is likely to develop in early manhood or womanhood when the individual's lowered resistance allows the early glandular infection to flare up.

Early positive diagnosis of glandular tuberculosis of the lung hilus is as a matter of fact a difficult matter. Emphasis should therefore be placed upon the importance of general hygienic measures throughout childhood and youth, especially where there is any reason to suspect tuberculosis exposure or infection in early life.

ROENTGENOLOGY, RADIOLOGY AND SKIAGRAPHY¹

The writer has just listened to three admirable papers delivered before the Council on Medical Education.² The authors traced the development of x-ray from discovery through to its present day application in practice. It seems that whole-time hospital salaried positions are coming to be the choice for our best trained men. Those with teaching medical school connections are apparently best situated. However, a note of sadness pervaded some of their discussion. They rightfully dislike becoming "institutional employees" rather than whole souled medical specialists, offering to or merging their opinions with physicians in general. In other words, they hold rightly that it is not their province simply to "build up a series of technical procedures"; nor may they be expected to use and sell "celluloid film at so much per square inch."

One speaker held that the expense of equipment and complexity of technic made isolated office practice of roentgenology unsatisfactory—hence the drift toward hospital centralization. Now, the present-day heart of the hospital has

¹Nomenclature is more than a mere matter of form. Each term is distinctive. Chairman P. M. Hickey, of Detroit, asked for clearer definition to assist at least in outlining the field and in indexing the literature.

²Annual Congress on Medical Education, Medical Licensure and Hospitals, the A. M. A., Chicago, Feb. 18 to 20, 1929.

shifted a little from the record room to a proper use of its records in staff conferences. Here it is that all specialists must lose their "splendid isolation" and combine for a friendly grouping of the best that everyone concerned is able to establish. In this way are the patient's interests safeguarded and the hospital's reputation enhanced. Not only must the roentgenologist lose some of his dogmatism but the internist, surgeon and orthopedist must also slough off some of that self-sufficiency born of tradition and fostered by public esteem. All doctors are going to use the x-ray. It is so with the stethoscope. We need only recall that in the great Laennec's time there were not only those who became "stethoscopists" but others who roundly decried its use. It is useless to state that the simplicity of the stethoscope should not be compared with the complexity of the x-ray: it was a far more revolutionary step, in its time, for the profession to accept Laennec—and all his approach to chest diagnosis implied—than for our generation, surfeited with objectivity, to accept Roentgen. Stockholm is admittedly one of the greatest present-day centers for advanced roentgenology. Yet, we are told that the men making it so have not cut themselves off from practice in some other lines. Are we not all drifting back closer and closer to basic studies and understandings? Are we not more and more suspicious of him who, annoyed or perplexed by the elaborate confusion of practice, seeks solace within the limits of a narrow field? Obviously, roentgenology is not a narrow field—provided he who enters it has the necessary background and training. However, he must be more than a medically minded technician. Admittedly, he must have the closest touch with dermatologists to treat skin lesions safely; with orthopedists and surgeons, at least, in order to keep in touch with them. To the broadest type of general diagnostician comes the feeling that the correctly poised, disposed and trained roentgenologist is already an internist.

The days of enormous incomes for certain surgeons and internists is passing in most normal communities. The question of income and emolument is never easily adjusted. Cloistered hospital medical "employees" should not be afraid to stand up for their just rights, but first of all they should prove to the rest of the staff their capacity to teach, to guide and to develop bet-

ter approaches to diagnosis and treatment. "One man" domination in hospitals is rapidly disappearing. In fact, with objective disease under greater and greater control and subjective discomfort in a tired and luxury loving population increasing, the domineering figure of medicine in the future may not be the man with the scalpel or even an x-ray, but he of the subtle, understanding, synthesizing mind.

E. L. T.

QUESTION AND ANSWER COLUMN

For some time we have wished that a Question and Answer column could be run in the journal for the benefit of our readers. Almost daily some question in connection with practice arises in the mind of every practitioner. If he has close association with other members of the profession he is likely to put the question in his mind to someone and get some sort of answer. Many of us, however, might appreciate an opportunity to obtain answers from authoritative sources.

Heretofore, MINNESOTA MEDICINE has not felt it advisable to attempt an undertaking such as a Question and Answer column inasmuch as there has been no mechanism for the proper handling of such an activity. The Committee on Medical Education of the State Medical Association, of which Dr. N. O. Pearce is chairman, after due consideration has arranged for a staff of consultants who will furnish free to members of the Association information on any subject relating to practice. The undertaking has received the approval of the Council, and the services of Dr. William O'Brien, assistant professor of pathology at the University of Minnesota, have been obtained as director of the Bureau. There is every reason to believe that this is the beginning of a very valuable service to Association members.

The Bureau in addition to furnishing medical consultation will conduct the Question and Answer column for the journal each month, and its interest will depend on the use made of the Bureau. Questions should be sent to the Consultation Bureau at the Association office. There need be no fear of publicity in the matter as all communications will be considered confidential. The announcement of the committee appears elsewhere in this issue.

HISTORICAL COMMITTEE

In these days when the world is so small that we can cross to Europe in thirty-three hours or less, and it is not at all unusual for a patient to appear here with some tropical disease, still it may surprise many of you to know that the Asiatic Cholera took its toll of death in this country and that it was carried by immigrants into Minnesota. Its inroads in Saint Paul were of sufficient importance to stimulate the city to establish a Board of Health and appoint a Health Officer. Believe it or not, but two of our physicians contracted the disease and died of it. We have their names but not their pictures; however, we did secure a picture of the health officer and it took considerable detective work and ingenuity to get it. We are proud of that piece of work. The last death from Asiatic Cholera occurred in Minnesota as late as 1866.

An error was made in our last month's contribution. Dr. Stewart's initials were given as J. S. His name was Jacob Henry Stewart. Please note the correction.

We can keep this up a little longer, but we cannot complete our historical records without your aid. Dr. H. M. Workman of Tracy will receive and record all medical historical information you may send. Do it now.

J. M. A.

THE COUNTRY DOCTOR

Because he sought not wealth or fame,
He wore no conqueror's crown in life
And at his death no drums were heard.
Yet all who knew him mourned his passing—
The learned judge, the meek housewife,
The well-groomed banker and bronzed drayman,
All came to pay a last tribute
To him who in their hour of need
Had brought them comfort and new hope.
Each home had known his ministry;
Strong men his friendly counsel sought
And little children smiled through tears
Into his kindly wrinkled face.

He's gone. No more, through dark and storm,
On lonely roads, his muddy carriage
And work-worn horse are seen. But still
His memory, like cooling showers
Upon a drought-parched plain, lives on
In lives made better by his service.

—W. T. H. in *Garard Review*.

MISCELLANEOUS

ANNUAL REPORT OF THE UNIVERSITY OF
MINNESOTA MEDICAL SCHOOL FOR 1928*To the President of the University:*

SIR: The Medical School has had a prosperous year. Again the number of students has taxed our facilities and staff. We are now graduating about one hundred twenty-five each year from the medical course. Fifteen years ago the graduating class numbered forty-five.

ATTENDANCE

By regents' action the number of regular freshman medical students is restricted to one hundred. These are chosen from three hundred or more applicants early in July of each year. However, there is always a considerable number of worthy applicants who have small deficiencies and who cannot be regular freshmen under the rules of the school. To hold these back a full year would often work an injustice and serve no good purpose. They are therefore accommodated as unclassified students and given a special program. By attending the subsequent summer quarter they become regular sophomores and save a year's time. The sophomore class therefore numbers one hundred fifty or more.

The school and the large body of irregular students are under obligation to Dr. C. J. V. Pettibone, secretary of the Students' Work Committee, for the excellent handling of the group of irregular students, a difficult and time-consuming task.

When we come to the junior and senior years we try to hold to one hundred twenty-eight or sixteen sections of eight students in each class, as the number who can be accommodated by present hospital facilities. Our seniors work at the University Hospital, Minneapolis General Hospital, Glen Lake Sanatorium, and next year we shall send them for obstetrics to the Ancker Hospital (hitherto used only for juniors). We owe much to these institutions and are greatly indebted to Dr. List, Dr. Mariette, and Dr. Carter, superintendents respectively of the affiliated hospitals named above, and to their managing boards.

It will be seen that we are taking care of well over six hundred undergraduate medical students—nearly the largest number in any medical school in the country. Besides this the Medical School in its larger sense as an administrative unit educates about four hundred nurses, trains a considerable number of technicians, social workers, dietitians, and embalmers, conducts (with the Extension Division) numerous short courses for physicians in practice, and finally, through its departments, contributes to the education of dentists, physical education and home economics students, graduate students, and other university groups. The registration statistics of the Medical School, which will be found in the registrar's report, indicate therefore only partially the numerous activities of this branch of the University.

INTERN YEAR

The intern year as a requirement for the M.D. degree was first instituted by the University of Min-

nesota. The plan has been in operation over ten years now and has worked well. Our men get excellent internships all over the country. The Internship Committee has done important work in investigating the educational opportunities of hospitals and in placing our students. Dr. Litzenberg has been chairman from the inauguration of the required internship. Our debt to him is very large.

FACULTY

The faculty has been hard working and harmonious. Under the new and small Administrative Committee the details of management have been taken care of with a minimum of time and effort. No important faculty changes have been made. Promotions will be found listed in the president's report. The most important teaching change of the year was the organization of obstetrics and gynecology at the Minneapolis General Hospital on a university basis under Dr. Adair. This is a step in the direction of two university clinics in each major clinical subject. We now have two such clinics at the General, the other being medicine under Dr. Fahr. The policy is to organize and support these General Hospital clinics on the same basis and standard as those at the University Hospital.

Our faculty is increasingly called upon for addresses before scientific and medical gatherings. Notable trips during 1927-28 outside the country were those of Dr. Schlutz to the Argentine (as guest of the medical society there) and other South American countries, and to Havana; and of Dr. Berglund to Sweden.

RELATIONS WITH ALUMNI AND PROFESSION

A matter for congratulation during the year is the closer alliance with the alumni, brought about under the presidency of Dr. O. S. Wyatt of the Medical Alumni Association. The alumni banquet held June 13 during the meeting in Minneapolis of the American Medical Association was most enthusiastic. Over seven hundred graduates were present. This is reported to have been the largest gathering of Minnesota alumni ever got together, even exceeding any meeting of the General Alumni.

Under Dr. Wyatt's leadership plans are in making for an annual medical homecoming, with lectures and clinics as well as social features to bring back and interest our graduates. Dr. Wyatt's slogan is the "Alumni University." The Alumni Advisory Committee keeps in touch with the educational policy of the school and coöperates with the dean.

The school acknowledges its obligation to Dr. Wyatt for his devotion and intelligent work with the alumni, to Dr. N. O. Pearce for his service as chairman of the Extension Committee which conducts in coöperation with the state association increasingly valuable short course for physicians at different centers, and to Dr. W. J. O'Brien for his important work for the doctors of the state. At the present time relations with the alumni and the organized profession are good. There are still individual physicians who think there is ground for

complaint—that the University Hospital and Dispensary take as charity patients those who are able to pay for services.

The first obligation of any hospital is to render service to the sick. The superintendent of the University Hospital and those working with him desire to work with the physicians of the state to the end that good medical service may be rendered to all citizens. Efforts to prevent abuses are constantly made. But no system of financial inquiry is perfect. There are always border line cases on which honest difference of opinion exists. It is believed that better acquaintance and frank coöperation between the hospital and the profession will permit the hospital to be broadly useful and minimize conflict of interest between private and public medical agencies.

It is to be recalled that the University Hospital has a double function. It cares for patients and thus serves the state. It educates doctors and nurses, which also is a duty to the state. In a broad sense each generation of physicians trains the next generation. A comprehensive view of this matter on the part of the whole profession in the spirit of the Hippocratic oath—"To consider dear to me as my parents him who taught me this art, . . . to impart to my sons . . . and the disciples who have enrolled themselves . . . the precepts and the instruction"—will always contribute to harmonious action between the medical school and the profession itself. In this connection it is surprising to remark how many sons of our alumni and of the other doctors of the state are now enrolled in our classes.

HOSPITAL EXPANSION

During the year the plans for the Eustis Children's Pavilion, the Out-Patient Building, and the Students' Health Building have been completed. Construction will begin in July.

The support of these units is a matter of concern. The Eustis will be partially supported by endowment; the Students' Health Service will be supported by fees. So far as the rest is concerned the chief source of revenue must be the law covering county-state indigent patients. This law is excellent, but it is not yet in perfect operation. The state's half is supposed to be in the general university appropriation, but the exact amount has not been defined. The counties' half was appropriated at \$100,000 for each year of the present biennium, but this is less than the counties will actually pay into the state treasury.

We favor the separation of both these items from the general university appropriations. This is justified on the ground that the hospital is a service enterprise, taking care of incapacitated, indigent citizens. The hospital should grow to the extent that the counties (which are the ultimate source of all the money) may desire to make use of its facilities. There is always a long waiting list which indicates such a desire on the part of counties. We think that separate appropriations should be made for the estimated amount of the counties' payments and for an equal amount to meet the state's half. Toward the latter we believe \$100,000

per annum may be assumed to be already in the university appropriation. This should be segregated and given to the hospital by direct appropriation.

In addition to these special appropriations the hospital should receive a reasonable amount from university support on account of its educational functions. It is commonly agreed that the hospital can use its earnings from the smaller number of pay patients, Health Service patients, dispensary fees, etc. On the basis outlined the support and growth of the hospital can be assured.

THE MINNEAPOLIS GENERAL HOSPITAL

The plan for the removal of the Minneapolis General Hospital to the neighborhood of the campus and its establishment on land to be purchased by a gift from the General Education Board has been definitely abandoned. At the same time relations with the hospital have become increasingly intimate and cordial. The Welfare Board of the city takes a broad view of the relations of their institution to the education of doctors and nurses.

Mr. William F. Kunze of that board has proposed that the University take over the active management of the General Hospital at a nominal rental; that the University take care of the city's patients on a per diem basis; and that the University erect on the campus new hospital facilities as such may be needed to meet the growth of the city. In the course of years this plan would result in the concentration of the care of the poor of Minneapolis in the University Hospital on the same basis that the care of the poor of the state outside the large cities is accomplished. For the city the plan has the great advantage of avoiding a bond issue for a new hospital. For the University the plan envisages enlarged and controlled clinical facilities. It appears that this splendid ideal would appeal to philanthropic citizens, and that gradually the University would receive the necessary money for new units for its hospital just as the Elliott, Christian, Todd, and Eustis bequests have come in the past.

Mr. Kunze's plan has received a good deal of informal discussion. So far as known there are no formidable arguments against it. It is manifestly to the public interest both from the standpoint of the city and the state. It would contribute to the placing of the Medical School in the very front rank of such institutions. It is hoped it may be brought to conclusion in the coming year.

TUITION FEES

By vote of the Board of Regents Medical School fees have been raised from sixty dollars to seventy-five dollars per quarter. This is justified by the argument that prospective professional men should pay a larger share of the expense of their education. The increased receipts thus provided will strengthen the school in various places, an important one being obstetrics, in which we shall now be enabled to provide supervised teaching at the Ancker Hospital.

The reports of the superintendent of the University

Hospital and the director of the School of Nursing are appended.

Respectfully submitted,
E. P. LYON, *Dean*.

SCHOOL OF NURSING

The following report for the year July 1, 1927, to June 30, 1928, is submitted for the School of Nursing:

The statistical report for regular students is to be found in the registrar's report so is not given in detail here.

The report for students in the five-year course and for students affiliating from other schools of nursing in the state is as follows:

FIVE-YEAR COURSE IN ARTS AND NURSING

	1927	1928
In College of Science, Literature, and the Arts, and College of Education.....	38	48
In School of Nursing.....	32	44

Total registration in five-year course..... 70 92
Students receiving B.S. degree in combined course since June, 1927—10.

AFFILIATING STUDENTS (FROM OTHER SCHOOLS OF NURSING)

	1927	1928
Students in school on last report.....	80	75
New students since last report.....	42	53
Total registration	122	128
Students finishing course	42	67
Students cancelling	5	7
Present total	75	54

In order to make room for the regular students in the School of Nursing, the number of affiliating students to be admitted is steadily being reduced.

This year, for the first time, regular courses are being offered during the Summer Session in Administration in Schools of Nursing, and Ward Teaching and Supervision. Several outstanding people in the nursing field have been brought here to conduct these courses.

With the growth of the school, the need of a nurses' building is increasingly felt. The scattered housing of students at the University Hospital offers many problems and difficulties of administration, and the distance from the hospital is a real hardship for students, especially late at night and during the bad weather.

Respectfully submitted,
BARBARA A. THOMPSON,
Acting Director.

UNIVERSITY HOSPITALS

Attached is statistical report for the year 1927-28. We had an increase of 8,383 days over last year. The per capita cost was cut about forty cents a day.

During the year we have finished the plans, and are ready to start the addition including the Eustis Hospital, Out-Patient Department, and University Health Service, providing a total, including previous facilities, of 440 beds. There is an increase in the demand for

beds in the hospital on the part of the counties, and there is no question but we will be able to make use of all beds, provided a sufficient appropriation is made under the county-state act.

Work in remodeling the service building is progressing and should be finished by fall. This provides a laundry to serve the whole campus, new kitchens, dining rooms, new children's ward, and will furnish additional hospital space when the internes move into the new building.

The report of the Nursing Department is included in the report of the School of Nursing. During the year the National Committee appointed to study nursing education made its first report. It is of especial interest to the university hospitals, and it seems that we should make a careful study of our central school in connection with the findings of this report.

I again wish to call attention to the need for a nurses' home and hope we will use every possible means to bring about the building of such a home during the coming year. It is very unsatisfactory to have the nurses scattered as they are and the cost is excessive.

We should also renew activity in order to bring about the building of a psychopathic department of our hospital which was authorized by the legislature four years ago. This would serve as an admission unit to the various state hospitals and would add much needed teaching facilities for the Medical School.

We have arranged with the Home Economics Department to send their students to the University Hospital for training in dietetics. We are also paying part of the salary for a special worker in connection with the Department of Sociology to teach medical social work, and steps are being taken to bring about a more satisfactory arrangement between the Dental School and the Dental Department of the hospital.

The X-Ray Department is doing splendid work under the direction of Dr. Rigler. Dr. Stenstrom is making important studies in connection with x-ray, radium, and physical therapy. Foundations should be encouraged to provide an endowment fund for the Cancer Institute. Our physical plant makes it possible for us to take a very important part in the study of cancer, but we are handicapped for lack of funds.

The Out-Patient Department is carrying on very satisfactory work. The number of admissions has been slightly cut because of the careful investigation of applicants. We are endeavoring to carry on the work of the hospital in a way which is absolutely fair to the medical profession. The new Out-Patient Department should mean a great deal to the Medical School, as the most important training is given in connection with ambulatory patients.

During the year the superintendent has visited many counties of the state in order to become acquainted with the medical profession. It is his purpose to visit all counties.

I wish to thank the heads of departments, employees, as well as the administration of the Medical School and University, for help and coöperation during the past year.

Respectfully submitted,
PAUL H. FESLER, *Superintendent.*

EARLY DIAGNOSIS OF TUBERCULOSIS CAMPAIGN

Two one-day post-graduate courses will be held as a part of the Christmas Seal "Early Diagnosis" campaign of the Minnesota Public Health Association. The Minnesota State Medical Association and the institutions at which the courses are to be held are coöperating. Applications for these courses, which are to be limited to twenty-five physicians, may be made to the Minnesota Public Health Association, 11 West Summit Ave., St. Paul.

The first course will be conducted at the Lymanhurst Hospital School, Minneapolis, April 11, by members of the medical staff and will be devoted to "Childhood Tuberculosis." The tentative program follows:

Purpose and Program of Lymanhurst, Dr. F. E. Harrington, Health Commissioner, Minneapolis;

Result, Dr. L. F. Richdorf, assistant professor of pediatrics, University of Minnesota;

Diagnostic Steps, Dr. C. A. Stewart, assistant professor of pediatrics, University of Minnesota;

X-ray Findings, Dr. Malcolm B. Hansen;

Bone and Joint Tuberculosis, Dr. Paul W. Geisler;

Treatment, Dr. J. A. Myers, associate professor of preventive medicine, University of Minnesota.

Clinical demonstrations will be given throughout the afternoon by members of the Lymanhurst staff. Closing the course will be the annual Lymanhurst banquet. Speakers include two outstanding authorities on tuberculosis: Dr. Henry Boswell, medical director, Mississippi State Sanatorium, and Dr. Ralph C. Matson, medical director, Portland Open Air Sanatorium, Milwaukee, Ore.

The State Sanatorium at Ah Gwah Ching has been selected for the second course, to be held May 2. All forms of tuberculosis will be discussed at this course, which will include examination of cases and demonstration of pneumothorax treatment. In addition to Dr. H. A. Burns, superintendent of the state sanatorium, and his medical staff, the following have been invited to take part in the program: Drs. J. A. Myers, associate professor of preventive medicine, University of Minnesota; F. F. Callahan, Pokegama Sanatorium; C. B. Wright, Minneapolis, past-president, Minnesota State Medical Association; R. L. Laney, superintendent, Lake Julia Sanatorium, Puposky; J. A. Thabes, Brainerd; and L. A. Rigler, Minneapolis.

Arrangements are now under way for a short course to be held April 20 at the Tuberculosis Pavilion of Ancker Hospital, Saint Paul. The course will be under the direction of Dr. Everett K. Geer.

REGISTRY OF TECHNICIANS OF THE AMERICAN SOCIETY OF CLINICAL PATHOLOGISTS

In accordance with the trend of the times, the practice of medicine is utilizing more and more the services of trained lay help. The advent of the laboratory as an indispensable aid in the diagnosis of disease has created a new specialty in medicine—that of clinical

pathology. In order to carry on the numerous technical tests required in scientific diagnostic procedures, the laboratory director has found it necessary to train the technical personnel. With the standardization of hospitals and the urgent call for qualified laboratory assistants there has arisen a demand for proper standardization of the preliminary education and technical training of those enrolled in this new profession.

There has also been a desire on the part of those engaged in this useful calling to raise their status, similar to the evolution of the trained nurse of a generation ago. This want is now being taken care of by a national organization consisting of a body of men who are most vitally interested in elevating the intellectual and technical status of laboratory workers. The American Society of Clinical Pathologists has taken upon itself the task of organizing a Registry of Technicians with rules under which those qualified by education, technical instruction, and moral character will receive a certificate.

The subject is of interest to physicians in every field of endeavor, as many of them are desirous of securing the services of technicians to carry on the routine laboratory procedures.

There is no doubt that the elevation of the laboratory technician to the status of a respected and useful calling will be a great help to the medical profession, to the patient, and to the scientific practice of medicine.

The headquarters of the Registry of Technicians of the American Society of Clinical Pathologists are located in the Metropolitan Building of Denver, Colorado.

Another very desirable feature of the Registry is the facilities it offers in finding suitable placement for registrants and in aiding physicians to find desirable applicants.

ANNOUNCEMENT EXTRAORDINARY

It is with the greatest pleasure that your committee on Education of the State Medical Association announces the inauguration of THE CONSULTATION BUREAU for the members of this Association.

Pursuing the policy that the State Association should do all in its power to promote the highest standards of medical practice among its members, we have organized and placed at your disposal the facilities and resources of a consultation service, with headquarters in the Saint Paul office of the State Association.

For the time being the Bureau will be conducted under the general supervision of a sub-committee of the Committee on Medical Education, composed of N. O. Pearce, Minneapolis; E. H. Hammes, Saint Paul; F. J. Hirschboeck, Duluth, and G. E. Brown, Rochester, with Wm. A. O'Brien, Assistant Professor in Pathology, well known medical authority, as director in charge.

The function of this Bureau is to furnish the members of this Association with prompt and confidential

information on any subject relating to the practice of medicine. The resources of a staff of the most competent consultants in every line of medical endeavor will assist Dr. O'Brien in obtaining for you the information desired. No question is too trivial and no problem too large for you to submit to this Bureau for an opinion.

This enterprise of the State Association will furnish its members an unexcelled opportunity for a private and confidential informal consultation on problem cases. The director and his secretary will be the only persons to know the identity of the physician making consultation request. Prompt reply will be the keynote of this service and there will be no charge.

Telephone or telegram consultations, while ordinarily unsatisfactory, will be accepted in emergency cases, all such expense to be borne by the requesting physician.

A Question and Answer Column in MINNESOTA MEDICINE will be conducted by this Bureau. Watch this space for interesting bits of information and case analysis.

Address all communications to Consultation Bureau, Minnesota State Medical Association, 11 Summit Ave., St. Paul, Minn.

N. O. PEARCE,
Chairman, Committee on
Medical Education.

A NEW WAY OF TYING THE UMBILICAL CORD

Thick umbilical cords sometimes shrink with bleeding that is alarming, sometimes fatal. Sepsis sometimes develops even though the physician has taken great pains to prevent it.

Nature accomplishes healing without infection, under the most unfavorable conditions by quick drying. Methods which accomplish quick drying work out the best.

The following method of tying the cord with a rubber binder accomplishes quick drying and is as sure a method of preventing bleeding as can be devised.

1. Tie a string at each end of a small rubber binder.
2. Clamp one end of the rubber binder on to the umbilical cord with an artery forceps, stretch the binder and wind it around the umbilical cord as near to the skin as possible.
3. Tie with the string, taking a turn or two with the string to make all secure.
4. Cut the cord close to the tie.
5. Pack around with sterile gauze to absorb moisture.

The above, of course, includes the usual methods of asepsis and disinfection.

This method is simple, inexpensive, can be applied quickly and gives good results.

C. G. KELSEY, M.D.,
Hinckley, Minnesota.

OBITUARY

Chauncey J. V. Pettibone 1884-1929

Chauncey J. V. Pettibone, assistant professor and head of the department of physiological chemistry at the University of Minnesota Medical School, committed suicide at his apartment, March 7, 1929.

Mr. Pettibone was born in Fond du Lac, Wisconsin, October 19, 1884. He graduated from the University of Chicago in 1907, studied in Berlin and from 1909 to 1911 did postgraduate work at Harvard, where he received his Ph.D. degree. The following year he studied at Halle, Germany.

Mr. Pettibone came to the Medical School in 1912 and in addition to instructing in physiological chemistry he has been adviser to students about to enter the medical school, assisting them to select their courses.

A letter which had been written by Mr. Pettibone to Dean Lyon of the Medical School led to the discovery by the Dean of the suicide. The note stated that Mr. Pettibone had been in ill health and unable to sleep. He was found seated on a stool in front of the gas range, with his head in the oven and the jets open. A rug had been draped in front of the oven door and over his head, evidently to confine the gas to the oven.

David Albert Locke 1855-1929

Dr. D. A. Locke, Minneapolis physician for 45 years, died at his home Feb. 20, 1929, at the age of 74. Dr. Locke graduated from the University of Minnesota in 1881 and from the Hahnemann Medical College of Chicago in 1884.

His was a familiar figure in that district of Minneapolis. He was of the old type of family physician and was known far and wide in his community. He was one of the first men in Minneapolis to own an automobile and many a Minneapolis citizen of today still recalls with delight the rides he had as a boy with Dr. Locke.

Dr. Locke came to Minnesota with his parents in 1865 and settled on a farm at Lake Minnetonka, near Groveland, which his father had purchased in 1854.

He is survived by three brothers, Cassius M. Locke of Minneapolis, S. A. Locke of Los Angeles and the Rev. William H. Locke of Geneva, Ill.

Charles F. Nootnagle 1864-1929

Dr. Charles F. Nootnagle, prominent Minneapolis physician and surgeon, died suddenly of heart disease Thursday, Feb. 28, 1929, on his sixty-fifth birthday.

Dr. Nootnagle had practised medicine in Minneapolis for 39 years and had built up an extensive practice. His death was entirely unexpected, as it was preceded by no apparent illness, and came while he was seated in a chair at his home. He died within a few minutes of the heart attack.

Dr. Nootnagle was a graduate of the University of Minnesota and the Physicians and Surgeons College, New York city. After completing his courses at the latter institution he went abroad to study at Berlin, Germany, and Vienna, Austria-Hungary. Upon his return to America he practised medicine at Evansville, Minnesota, then moved to Minneapolis.

Surviving him are his wife; a daughter, Mrs. H. W. Spink, of Kansas City; a son, Philip Nootnagle, of Florida, two brothers, Herman, of Sisters, Oregon, and Fred, of Tyler, Minn., and a sister, Mrs. Gustav Kaphan, of Tacoma, Wash.



A PAGE FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION



Public Health

"In public health the discoveries of science have opened a new era. Many sections of our country and many groups of our citizens suffer from diseases the eradication of which is a mere matter of administration and moderate expenditure. Public health service should be as fully organized and as universally incorporated into our governmental system as is public education. The returns are a thousandfold in economic benefits and infinitely more in reduction of suffering and promotion of human happiness."

HERBERT HOOVER, President of the United States.

The United States has a president who gives some space in his inaugural address to the question of Public Health of his Country. We are curious to know what the President's idea of the "limits" of public health might be. There is such a vast difference of opinion as to what comprises public health and what comprises the practice of medicine. The Minnesota State Medical Association is fortunate in having progressive state officers. The state officers have recognized that the "limits" of public health and the practice of medicine vary a great deal in the minds of many of the public.

The function of the Committee on Public Health Education is to study the attitude of the public as to the practice of medicine, and to keep the profession and the public informed as to what comprises the practice of medicine in the best judgment of the medical profession.

The Committee on State Health Relations was created because of the increasing scope of state medicine. State medicine is here and undoubtedly is necessary to a certain degree. The question for the doctors of the State Medical Association to study is to what degree is state medicine advisable and then to help guide legislation and public opinion along the lines determined upon.

The following is a partial list of tax supported Minnesota Institutions under the Board of Control:

Anoka State Asylum	Deerwood Sanatorium
Hastings State Asylum	Fair Oaks Lodge Sanatorium
Willmar State Asylum	Glen Lake Sanatorium
Fergus Falls State Hospital	Lake Julia Sanatorium
Rochester State Hospital	Mineral Springs Sanatorium
St. Peter State Hospital	Nopeming Sanatorium
School for the Feeble Minded	Oakland Park Sanatorium
Colony for the Epileptics	Otter Tail County Sanatorium
School for the Blind	Ramsey County Tuberculosis Pavilion
School for the Deaf	Riverside Sanatorium
Minnesota Sanatorium for Consumptives	Sand Beach Sanatorium
Gillette State Hospital for Crippled Children	Southwestern Minnesota Sanatorium
Buena Vista Sanatorium	Sunnyrest Sanatorium

The above list, you will note, does not include the University Hospital, or such county and city tax supported institutions as the Ancker and the General Hospitals.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MINNESOTA STATE MEDICAL ASSOCIATION

The Committee on Scientific Assembly for the sixty-first annual meeting of the Minnesota State Medical Association which will be held in Saint Paul, May 13, 14 and 15 completed the program at its meeting on Saturday, March 9.

Monday morning will be given over to an intensive clinical program to be put on by the members of the Ramsey County Medical Society; Monday afternoon to a program on fractures by the Minnesota Orthopedic Club. Monday evening the members and their families are invited to listen to a discussion on "The Cost of the Medical Care" by O. E. Locken, Crookston; Michael Davis, Rosenwald Fund, Chicago; and Morris Fishbein, American Medical Association.

Tuesday and Wednesday, commencing at 9:30 a. m., an interesting scientific program has been arranged. Symposia on Diabetes, Heart, Goiter and Urology will be featured. The moving pictures: Diagnosis and Treatment of Infections of the Hand by Allen B. Kanavel, The Cinematograph Demonstration of Living Tissue Cells Growing in Vitro by Canti, and the Davis Obstetrics film will be shown.

All the above meetings will be held at the Masonic Temple and lunch will be provided at a moderate price. On Tuesday evening the annual banquet will be held at the Saint Paul Hotel. The House of Delegates will meet on Monday afternoon, and on Tuesday noon they will install officers.

Indications are that this is to be the best and most interesting program that the Minnesota State Medical Association has ever had.

ANNUAL CONFERENCE OF SECRETARIES

A record attendance and a program of unusual interest is reported for the annual conference of secretaries of component societies of the Minnesota State Medical Association held in Saint Paul, February 23. Fifty-seven physicians, representing twenty-four societies, registered for the meeting, and this number was supplemented by many Twin City physicians at the dinner and luncheon sessions. Six states were represented at the Northwestern Regional conference which was held in conjunction with the state meeting.

Legislation and publicity were the major topics of discussion at the one-day conference of secretaries. That physicians should be represented on committees and take an active part in planning and directing activities of local organizations was stressed in a discussion of "Lay Health Organizations" by Drs. C. G. Kelsey, Hinckley, and J. P. McDowell, St. Cloud, at the opening session, at which Dr. E. A. Meyerding, state secretary, presided.

Newspaper publicity, from the standpoint of the doctor, the editor and the public, formed the theme of a number of talks during the morning and at the noon-day luncheon.

Health information is now demanded by the public, who will seek and get it wherever possible. If the physician, who is the logical leader because of the valuable scientific knowledge he possesses, does not assume responsibility in public health education, others will. This was the consensus of a group of physicians and newspaper editors who discussed the various phases of public health education and publicity. Among the speakers were: Drs. George Earl, chairman of the health education committee of the Minnesota State Medical Association; Theo. Satersmoen, Pelican Rapids; W. F. Wilson, Lake City; and Arnold Daane, managing editor of the Austin Daily Herald, and H. F. Hotaling, secretary, National Editorial Association.

That the press is the greatest single factor in moulding of public opinion and that publicity is a recognized factor with any organization that is making progress today was stated by Dr. Earl. The weekly news service of the state association is now being sent on request to 240 papers in Minnesota, Dr. Earl said, and the majority of the papers use the articles regularly in good space in the papers.

In a discussion of the use of the names of physicians in publicity, Dr. Earl pointed out that there is a great variety of opinion with a general tendency towards the use of names, but that Minnesota is still conservative in this respect. Newspapers are not in a position to eliminate names of individual physicians from their columns, according to Arnold Daane of the Austin Herald, for two reasons: In the first place, it is necessary for the papers to place responsibility for statements that are made, and in the second place, without names a news story loses its interest and personality.

Dangers in general use of medical publicity were brought out in a talk by Dr. Herbert M. Fisch, Austin, and discussion by Dr. W. C. Woodward of the American Medical Association, Chicago. Among the dangers mentioned by the speakers were: It gives undue publicity to one practitioner; it gives the charlatan a chance to sell his wares; it gives the physician who may be skilled in the ways of publicity an unfair advantage over other doctors, who may be better equipped scientifically, but know nothing of publicity methods.

In a symposium on "Is the Physician Entering Co-operative Medicine," advantages and disadvantages of clinics, the economy in co-operative buying and the value of a physicians' service bureau in collections and credit ratings were described. Those taking part were: Drs. D. D. Hilger, St. Paul; L. J. Holmberg, Canby; Edgar T. Herrmann, St. Paul, and H. F. Whittle, Minneapolis.

Co-operation of the secretaries in fighting unfavorable legislation was asked by Dr. H. M. Johnson of Dawson. The three outstanding bills of interest of the medical profession are the hospital, naturopathic and compensation, Dr. Johnson said.

At the luncheon meeting, at which Dr. J. T. Christison, president of the Minnesota State Medical Association, presided, Mrs. Ben. F. Davis, Duluth, auxiliary president, told of the aims and achievements of her organization.

Confidence in the ultimate success of the basic science law in protecting the public was voiced by F.

Manley Brist, Saint Paul, investigating attorney, Minnesota State Board of Medical Examiners.

"The basic science law is one of the finest pieces of medical legislation ever listed on the books of Minnesota," Mr. Brist said. "It will in the long run do more in preventing the public from being swindled out of money than any other law."

Public opinion is the chief objection to the enforcement of the law, Mr. Brist pointed out, and he urged more general education on the methods of quackery.

Plans for a statewide diphtheria immunization campaign were outlined by Dr. C. B. Wright of Minneapolis, and Dr. F. W. Schlutz of the University of Minnesota. Demonstrations of proper use of toxin antitoxin to physicians and a general public educational campaign urging parents to take their children to the family physician for immunization are included in the plans.

"The ideal age for inoculation is before the age of one year," Dr. Schlutz said. "Parents should be instructed right after the birth of the child to bring him back for this protection during the first year. The highest death rate is between the ages of one and five."

Assistance to doctors who are isolated, through a Consulting Bureau for Physicians, was proposed by Dr. N. O. Pearce, Minneapolis. Action to start this work at once was taken at the State Council Meeting. Progress of post-graduate medical work was described by R. R. Price of the Extension Division, University of Minnesota.

Joint dinner meetings of the auxiliaries with the medical societies serve to increase attendance at medical meetings, it was explained in the symposium on "How to Make a Medical Meeting Interesting." Among those taking part were: Dr. C. L. Scofield, Benson; G. I. Badeaux, Brainerd; C. J. Plonske, Fairbault; and H. C. Cooney, Princeton.

AMERICAN COLLEGE OF PHYSICIANS

The American College of Physicians will hold its Thirteenth Annual Clinical Session in Boston, April 8-12. Dr. Charles F. Martin, Dean of the Faculty of Medicine, McGill University, is President of the College this year, and Dr. John H. Musser, Professor of Medicine at Tulane University Medical School, is President-Elect and will be inducted to the Presidency toward the end of the Boston meeting. Dr. James H. Means, Jackson Professor of Clinical Medicine at Harvard Medical School and Chief of the Medical Service at the Massachusetts General Hospital, is General Chairman of all Boston Committees having charge of arrangements for the Clinical Session of the College in April.

The program provides hospital visits, clinics, demonstrations and ward-walks during the forenoons at fifteen different Boston hospitals, and for general scientific sessions each afternoon and evening in the Assembly Room of the Hotel Statler, which will be headquarters. Eminent authorities in their special lines will present the results of their work before an audience

competent to appreciate the value of the contributions.

The annual banquet of the College will be held Thursday evening, April 11, when Dr. George E. Vincent, President of the Rockefeller Foundation, will deliver the chief address. The Convocation, for the conferring of Fellowships, will take place Friday evening, April 12. Dr. Charles F. Martin, of Montreal, will deliver the Presidential Address.

Programs and details concerning reduced fares, admission, etc., may be secured from the Executive Secretary, E. R. Loveland, 133-135 S. 36th Street, Philadelphia, Pa.

AMERICAN PROCTOLOGIC SOCIETY

Detroit, May 13, 14 and 15, 1929

The American Proctologic Society will hold its annual meeting in Detroit—"The Convention City"—on May 13, 14, and 15. The Hotel Statler has been selected as headquarters for the scientific program, and the scientific and commercial exhibits.

Any Doctor of Medicine who graduated from a recognized medical school and who is a member in good standing of his county and state societies, and the A. M. A., and who is especially interested in proctology shall be eligible for election as an Associate Member of the American Proctologic Society.

Applicants for Fellowship in this society must have limited their practice for at least seven years, and except under unusual circumstances applicants will not be considered who are not members of good standing in the American College of Surgeons. Men who have limited their practice to proctology for less than seven years are eligible as associate members without this restriction.

The following is the list of officers: Edward G. Martin, M.D., President, 1447 David Whitney Building, Detroit, Michigan; Arthur H. Earley, M.D., Vice-President, Denver, Colorado; Walter A. Dansler, M.D., Secretary-Treasurer, 531 LaSalle Building, Minneapolis, Minnesota.

Any reputable medical man will be welcomed as a guest at this meeting: registration fee, \$5.00.

LYMANHURST ANNUAL STAFF DINNER AND OPEN BANQUET

Lymanhurst, of Minneapolis, commonly known as the school and clinic for tuberculous children, is under the jurisdiction of the Minneapolis Board of Public Welfare. It is directed by the Commissioner of Health, Dr. Francis E. Harrington, and maintains an executive, research, clinical, visiting and honorary staff.

It announces itself as a municipal institution and available in the service of the city's tuberculous children.

It is seeking closer affiliations, for practical working purposes, with the various official and voluntary health agencies. In order to emphasize its desire for these better mutual relations, it proposes to convert its annual clinical staff dinner into an open banquet, at which

representatives of all these organizations and the friends of Lymanhurst at large will be welcome.

Plans for fuller interchange of health service will be presented at the Banquet, and addresses will be given by Dr. Henry Boswell of the Mississippi Sanatorium, upon "The Importance of Early Diagnosis of Tuberculosis," and by Dr. Ralph Matson of the Portland, Oregon, Sanatorium, upon "The Surgery of the Chest."

The banquet will be held at the New Nicollet Hotel on the evening of April 11, 1929, at six-thirty o'clock. During the morning and afternoon of that day conference and clinical programs will be conducted at Lymanhurst.

Reservations for the Banquet should be requested of Dr. R. O. Beard, Telephone Main 5275, 324 Citizens' Aid Building, and checks may be mailed to him.

INTER-STATE POST GRADUATE MEDICAL ASSOCIATION

The spring tour of the Inter-State Post Graduate Medical Association will take place between April 15 and May 9, 1929, starting at Rochester, Minnesota, where the first two days will be spent. Three days will be spent in Chicago, then Cleveland, Boston, New Haven, New York, Philadelphia and Baltimore will be included before the final clinics in Washington. The estimated cost for each passenger is \$525.00.

The 1929 Foreign Assembly of the Association will take place between the dates, May 25 and July 18. England, Scotland, Norway, Sweden, Denmark, Hamburg, Frankfurt and Paris will be included in the itinerary. The cost of the tour for each individual is placed at \$1,150.00.

For further information, write Dr. W. B. Peck, Managing Director, Freeport, Illinois.

MINNEAPOLIS SURGICAL SOCIETY

Dr. S. R. Maxeiner was elected president of the Minneapolis Surgical Society to succeed Dr. Stephen H. Baxter, at the annual meeting held March 3. Dr. M. J. Lynch was elected vice president; Dr. H. O. McPheeters, secretary-treasurer; and Dr. Theodore H. Sweetser, retiring secretary, member of the council. The newly elected officers will assume office in September. About 35 surgeons attended the meeting.

The scientific program included the following:

"Three cases of syphilis of the stomach," Doctors J. M. Hayes, J. A. Johnson, and S. R. Maxeiner.

"Case of fracture of the neck of the femur in a woman 93 years old, treated by cotton impaction and a Whitman cast," Dr. R. C. Webb.

"Impressions of some European surgical clinics," Dr. Ivar Sivertsen.

"The acute perforation of the duodenal ulcer," Dr. F. A. Olson.

OF GENERAL INTEREST

The amendment to the Workmen's Compensation Bill S. F. 301 was killed in Committee, February 26.

Edwin L. Wanous, son of Dr. and Mrs. Edwin F. Wanous of Minneapolis, died February 15. He was 18 years old.

The two-year-old son of Dr. and Mrs. H. M. Jurgens of Belle Plaine died in January of pneumonia and complications.

Dr. A. S. Hamilton, Minneapolis, was appointed a member of the Editing and Publishing Committee for a term of two years.

Dr. Myron O. Henry of Minneapolis has returned from visits to southern clinics, where he spent the two months of February and March.

Dr. J. P. Schneider of Minneapolis has severed his connections with the Nicollet Clinic and is retiring from active practice on account of ill health.

Mrs. L. B. Baldwin, widow of Dr. Baldwin, formerly superintendent of the University Hospital, Minneapolis, died in Duluth the morning of March 18 of apoplexy.

Members of state executive committees of the American College of Surgeons elected at the business session of the northwest section of the organization held in Minneapolis March 11 included the following:

Dr. Wallace H. Cole of St. Paul was named chairman of the Minnesota division while Dr. J. M. Hayes of Minneapolis was elected secretary. Dr. O. J. Hagen of Moorhead was elected Counsellor for Minnesota.

Word has been received of the death of Mrs. Katherine Cornelia Granger, wife of Dr. Charles T. Granger of McGregor, formerly of Rochester. Mrs. Granger before her marriage some thirty years ago was head nurse at the Northwestern Hospital in Minneapolis.

At a recent meeting of the Council, the resignation of Dr. Earle Hare as treasurer of the Minnesota State Medical Association was accepted. Dr. A. G. Schulze, secretary of the Ramsey County Medical Society, was elected to fill the vacancy caused by Dr. Hare's resignation.

The Minnesota Society of Internal Medicine is offering a prize of \$250.00 for the third consecutive year to the practising physician, exclusive of members of the society, in Minnesota who has been deemed most worthy to receive a prize in research in clinical medicine. Inquiries should be addressed to Dr. E. L. Gardner, Secretary, 610 Yeates Building, Minneapolis.

The Eitel Hospital in Minneapolis has been purchased by the Nicollet Clinic and plans are being made to add the three stories originally contemplated by the founder, the late Dr. Eitel. The hospital was founded in 1912

and the first unit completed two years later at a cost of \$250,000. A second unit, known as the Loring Medical building, was added in 1925 at an approximate cost of \$150,000.

For North Dakota, Dr. Murdock MacGregor of Fargo was elected to the position of chairman and Dr. Archie D. McCannel of Minot was named secretary. Dr. Henry H. Healy, Grand Forks, will be the new counsellor. Dr. Frederick Teron, Chamberlain, S. D., was elected chairman of the South Dakota division, and Dr. F. Daniel Gillis of Mitchell, secretary. Dr. Jesse D. Whiteside of Aberdeen was named counsellor.

Professor Clemens von Pirquet is reputed to have committed suicide with his wife on February 28. Mrs. Pirquet's ill health and financial troubles are supposed to have been the causes of the tragedy. Professor von Pirquet had been director of the pediatric clinic in Vienna for a number of years. He was professor of pediatrics at Johns Hopkins for two years before the war. During the war he developed the "nem" system for feeding children, using the sitting height-weight ratio to determine the required calories.

Dr. von Pirquet came to the University of Minnesota in 1923 to head the department of pediatrics but stayed just two weeks. The reasons for his brief stay were never satisfactorily explained but homesickness was mentioned.

Dr. von Pirquet will be remembered by the cutaneous tuberculin test which bears his name.

TYPHOID CARRIER RECORD IN NEW YORK

During the year 1928, 20 newly discovered typhoid carriers and 3 carriers from other states or from New York City were added to the Health Department's list in upstate New York, exclusive of those in State institutions. The total number of carriers on record at the end of 1928 was as follows:

Upstate (exclusive of State institutions).....	167
State institutions	31

The investigations which led to the discovery of the 20 carriers were made by:

Local health officer or health department, 9; State Department of Health, 3; State Department of Health and local health officer, 3; attending physician, 3; routine examinations of food handlers in manufacturing plants, 2.

Forty-eight cases of typhoid fever occurring during the year were traced to the 20 newly discovered carriers. Four of these were male and 16 female. In all but 2 there was a history of a previous attack of typhoid fever—in one instance the attack having occurred 37 years before the discovery of the carrier condition. One had a questionable attack of typhoid fever 51 years ago and a definite attack about one year previous to discovery. Their ages ranged from 15 to 68 years. During the year gall-bladder operations were performed on 7 carriers (including one in a state institution), 4 being released from restrictions following such operations, after a series of laboratory specimens had indicated that they were no longer carriers.—*Health News*, March 18, 1929.

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of February 13, 1929

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, February 13, 1929. Dinner was served at 7 p. m. There were 43 members present.

Owing to the very lengthy program and considerable business to come before the Academy, the President, Dr. C. N. McCloud, called the meeting to order at 7 p. m. and presented each member with a ballot for preliminary voting.

After dinner the members re-assembled and the minutes of the January meeting were read and approved.

The scientific program of the evening consisted of the following papers and case reports:

DR. W. A. COVENTRY (Duluth) gave a paper entitled "Spinal Anesthesia: report of personal experiences."

DISCUSSION

DR. FRANKLIN R. WRIGHT (Minneapolis): I spent the summer of 1902 in the clinic of Professor Zuckerkandl in Vienna. Between that time and 1911 I used spinal anesthesia about 100 times. Since learning to use H. M. C. tablets I no longer use it.

Technic: You should have a needle which is sharp in the edge, but fairly blunt. It should be inserted so that the bevel of the needle is lengthwise with the body of the patient. The fibres of the dura lining the spinal canal run lengthwise of the body. The needle should be inserted so that the bevel of the needle will separate the fibres of the dura instead of cutting them. This will require less pressure and produce less shock. The needle should not be inserted too deeply, just enough to pierce the dura. The bulk of the spinal fluid lies between the dura and the pia. If the needle is inserted deeply enough to pierce the pia only a small amount of fluid can be obtained and on re-injection only a very limited area is anesthetized.

In the early use of spinal anesthesia we were bothered with secondary hemorrhage; that is, oozing from the wound. We learned whenever muscular tissue appears blanched to give the patient promptly a full dose of strychnin. After adopting that we had no further trouble of this kind.

In our hundred cases we had trouble with two. In one case the patient was placed in a high Trendelenburg position. We had interference with the respiration and had to use artificial respiration for about thirty minutes. In another case, at the suggestion of my friend Dr. Farr, I used novocaine as an anesthetic. One grain was given. The patient died of novocaine poisoning. I always used tropicaine, except in this one case.

DR. E. S. JUDD (Rochester): Dr. Coventry's paper is very timely. Spinal anesthesia has come into more common use in the past year or two and we feel safer in employing it since we began giving ephedrin. Here-

tofore, we had drugs that would raise the lowered blood pressure following the use of novocaine in spinal anesthesia, but not until ephedrin was employed did we have a drug that would not only raise the blood pressure but would keep it elevated for some time.

In the past fourteen months we have used spinal anesthesia over 500 times, and we have not had a death result from the anesthetic. There have been some rather alarming and sudden changes and in one or two instances the reaction from the spinal anesthetic was so severe that it may have been a factor in the ultimate death of the patient. In not a single instance did death immediately follow the anesthetic nor could we say that it was responsible for the outcome. However, after spinal anesthesia the blood pressure should be estimated frequently and ephedrin should be used to overcome the effect of the novocain. Spinal anesthesia is now being used so generally by surgeons formerly much opposed to it that there can be no question but that in time it is to be one of the most satisfactory ones employed.

There are two great advantages in the use of a spinal anesthetic: (1) It minimizes the chances for pulmonary complications; and (2) it produces the most complete relaxation of the muscles and does away with oozing and bleeding, thus making an ideal operative field.

Dr. COVENTRY (in closing): Dr. Wright spoke of the kind of needle. Sise of the Tobey Clinic has invented a needle beveled on four sides. We have found sometimes that our fluid did not come out freely and have twisted the needle around. I think Dr. Wright's suggestion of having the bevel of the needle up and down, lengthwise of the body, is a suggestion well worth trying. So far as oozing from the wound is concerned, we have not had any trouble from post-operative hemorrhage. There is a decrease in the flow of blood due to lower blood pressure. Our impression from the use of ephedrin was that giving the second dose does not have the same effect as the first dose; and giving it just before the anesthetic would tend to keep the blood pressure sustained. We had one case with a blood pressure of 210 which came down to 140 and the patient never "batted an eye." We did, but the patient was all right.

Dr. A. N. COLLINS (Duluth) read a paper on "Fractures of the Knee Joint." This was illustrated with numerous lantern slides.

DISCUSSION

Dr. M. S. HENDERSON (Rochester): This group of cases is very interesting and I think Dr. Collins has shown us something worth while. When we stop to consider the kind of tissue through which the fracture extends, we can readily understand why in many cases operative interference does not effect the good result we might expect. This is because if the direct force is severe enough to actually crush, to any great extent, the spongy bone, it cannot be restored. All these cases shown by Dr. Collins involved only one bone—the tibia—

and that is the reason why conservative treatment gives such good results, for there is left one normal articular weight-bearing surface. When both bones are involved, surgical interference is more often necessary. In these cases with the fracture only in the head of the tibia, good function is not incompatible with poor anatomical restitution, as Dr. Collins has shown. Early institution of motion is essential, and delay means adhesions that will be the cause of permanent disability beyond what there should be.

Dr. EMIL S. GEIST (Minneapolis): I also appreciate Dr. Collins' able presentation. In some of these fractures, I do not feel as optimistic as Dr. Henderson does. I believe some of these cases need open operation. The orthopedic surgeon, of course, sees most of this type of knee injury a year or two after the accident has occurred.

When there is bad displacement of one of the tuberosities of the tibia, one must think of replacing it, as accurately as possible, to its normal position. If this is not done, disability and deformity will ensue. Dr. Collins' case of the dancing master presents excellent functional results in spite of much bony displacement and deformity, but it is an exceptional case. Not all similar cases get an equally fortunate result. In about half a dozen fresh cases, I had the temerity to operate and to replace the fragments so that the articular joint line of the upper end of the tibia was brought to normal. In these cases, I am sure that I achieved better results for the patient than if I had adopted a simple laissez-faire policy. In other words, I believe that when there exists a great amount of downward displacement and impaction of a tibial tuberosity, we are justified in opening, reducing the impaction and bringing the broken-off fragment to its normal joint alignment.

Dr. A. R. COLVIN (St. Paul): A fracture into a joint such as those described by Dr. Collins is usually accompanied by a good deal of hemorrhage into the joint and we have been accustomed to aspirate under these conditions.

In periarticular fractures, the reaction of the tissues around the joint is a very variable one; a very slight injury may result in a great deal of stiffness which lasts a long time and any attempt at mobilization seems to make it worse. This individual reaction of tissues is nearly as variable after trauma as it is after infection. One person with a non-suppurating infection may have a very stiff joint and another with a suppurating joint may have very little stiffness.

In fractures at the knee joint without much displacement and no tendency to displacement, I am inclined to do very little immobilization, but confine the patients to bed and let them move their joints as soon as possible. Non-operative reduction of these fractures is not very successful. Operative correction is not often necessary.

Dr. W. A. COVENTRY (Duluth): I just want to say that the first case Dr. Collins showed was reduced under spinal anesthesia and one could not ask for any more relaxation than we had in that case. It was a great help to the surgeon.

DR. A. T. MANN (Minneapolis): I think about ten years ago we used to operate on more of these fracture cases of the knee than we do now, but I still think there are some well-selected ones in which we may do some remarkable work. I recall a rather unusual case I had of a girl about thirteen years old who was run over by a motorcycle. She had a fracture of the ankle, a crushing of the leg, a compound fracture of the pelvis, and a T-fracture into the knee joint of the lower end of the femur with both condyles loose and split apart. In that case I did an open operation on her to fasten one of the condyles to the shaft. The external condyle I fastened with a Lane's plate. While I was working on the inside the internal condyle came out in my hand. I thought if I was going to do anything I would like to insert a bone-graft; and then I thought I could have no better bone-graft than the piece I had in my hand because it belonged to her and it would fit into place perfectly. It had been squeezed out like an orange out of its skin so that the cartilage was still in the joint. I put that condyle back into place and sewed the soft parts around it so that it was fairly snug. She had been bruised so much that she got a necrosis of some of the toes, the crushed leg below the knee was infected and became a bag of pus, and we had a great deal of pus oozing from my incision over the internal condyle. I thought I had lost everything, but my Lane's plate was still in place. To make it short, the thing all cleared up. That was fourteen years ago and the young woman was in my office just a few days ago. The Lane's plate was healed into place, the auto-graft of the internal condyle was firm and the external condyle was firm. She has a good knee joint. She has within 5 degrees or so of complete flexion, and she has normal extension. Which shows that sometimes we get results we do not expect.

DR. A. W. IRE (St. Paul): The important point in this matter is to make sure that the articular surface of the tibia is level. This recalls to my mind a case that Dr. Geist saw with us. He may recall the patient. This case had been operated upon elsewhere. The result was excellent except in this one fundamental respect: the articular surface was not level. The weight was thrown out of alignment and the result was not good.

I feel that there are two important things to be borne in mind in treating these cases: (1) to secure a level articular surface and (2) to mobilize them early.

DR. COLLINS (in closing): These cases were purposely chosen because they were fractures into the joint. They were restricted to fractures of the tibia. The treatment of effusion and hemorrhage around the joint is quite important. Surgical interference, or needling, should be avoided if possible. I mentioned a sharp angle of elevation. One of these patients came in with the upper end of the bone very much comminuted and with much swelling around the joint. I elevated the foot and leg on a Thomas splint to an angle of 45 degrees. Within three days almost all the ecchymosis was down in the thigh, almost to the hip, and with great reduction of swelling in the knee joint itself, as a result. These comminuted fractures in this

cancellous type of bone heal rather faster than simply straight fractures; therefore I think within two weeks we should begin a little movement. I have had good results, a little later in the course of treatment, with breaking up of the adhesions gently under anesthesia.

I believe the Thomas splint is excellent from the first, because one may take both splint and patient right down to the fluoroscopic room and mold the fragments into place as he wishes right under fluoroscopic vision.

DR. E. L. TUOHY (Duluth) gave in detail two case reports as follows:

(a) An Instance of Body Dehydration, Diarrhea, Acidosis,¹ Anuria, and Calcium Fixation.

A female, aged 38. Sudden overwhelming bloody diarrhea following three hours after eating certain "canned tomatoes."

Four striking trends developed:

1. Profuse bloody loose bowel evacuations.
(Loss of body alkaline bases)
2. Dehydration and drop in blood volume.
(Polycythemia—hypotension)
3. Acidosis and anuria.
(Disruption of normal osmosis)
4. Uremia—Calcium imbalance.

(Cheyne-Stokes respiration—near tetany)

This report is presented to illustrate the devastating influence on the body produced by decided breaks in important physiologic body constants. While postmortem confirmation of tissue changes is not available and the data accordingly incomplete, I ask you, nevertheless, to consider the rapid culmination of events leading to this woman's death. When an overwhelming diarrhea dehydrated her and at the same time took out of the body the vitally essential alkaline bases, an acidosis of high grade developed. This led to further anhydremia, because as the tissue cells became more acid the fluids of the blood (and all that was injected by vein) left the blood vessels. The changes in blood pressure and influence upon osmotic pressure were promptly evidenced in a total anuria. Then followed a piling up in the blood of the acid phosphates and nitrogenous metabolites. On the one hand there developed the shift toward a more marked acidosis, begun by the diarrhea with its drainage out of the body of its sodium, potassium and calcium salts. On the other hand, the ammonia compound retention and the well known trend toward an alkaline shift in uremia dominated the picture as far as the respiration was concerned. Despite an acidosis the patient had periods of apnea and fairly characteristic Cheyne-Stokes respiration (well known to occur in uremia). Finally, the binding of the calcium in the relatively insoluble form (tricalcium phosphate), by retention of the acid sodium phosphates normally voided via the kidney, tied up the normal loosely held calcium from which arises the most essential ions (when dissociated) in solution. Hence, our patient had carpo-pedal spasm—a sort of "postmortem" rigidity, particularly of the muscles,

¹The etiology here is unknown. It had the early appearance of HgCl₂ poisoning but death was rather more rapid than usual (three days).

thirty-six hours before she died. Many other suggestive breaks come to mind when one considers the mental hebetude, alternating with delirium, shown by this patient, and the profuse bleeding from the gastrointestinal tract. Was the latter increased by calcium ion loss in terms of blood clotting and bleeding properties?

All fever is apt to suggest to us infection, and we rarely push the matter further. When we look at this temperature curve, however, in terms of the obvious dehydration here evidenced, and when we recall the body's compensating efforts to restore balance, the aim to speed up certain indispensable chemical reactions by increasing available body heat; when we likewise consider the vicious brain influence of anoxemia, the mounting pulse becomes less a matter of "heart failure" and more one of a wasting heroic effort to provide the body cells with their needs. Slides are shown to give a cross section of a few of these physiological episodes. It must be recalled that these are not static; the kaleidoscopic shifts are those of capillary permeability; of water balance; of Donnan equilibria and mineral base sufficiency; of oxygenation and a completion of metabolic breakdowns of fats and proteins; the liver de-throned as the great water and glycogen reservoir.

Some well advised critic may say, "Why all this analysis—what therapeutic good comes of it? Well, it is by a study of the extreme that we come to sense the presence of the less extreme. Should we seek for these body shifts earlier we might be in a position to do something when body balance may be restored. Too often we use intravenous saline or glucose as a panacea. It is not easy to look at a patient and say whether an acidosis or alkalosis exists. We know that patients vomiting severely (post-operative and with pregnancy) usually have an alkalosis and are easily rehabilitated by glucose and saline. The patient here reported had Cheyne-Stokes breathing and yet had a CO_2 plasma combining power of 39.

If we are to maintain water balance we must not wait until the PH shift is far toward an acidosis.² In like manner, if we do use sodium bicarbonate intravenously we must know that the amount needed is heroically large and is not readily and evenly distributed where it is needed. Access to the cells is broken and if the shift to alkaline is made too rapidly the rush of water to the capillary channels is so much of a gush that pulmonary edema supervenes. This has been seen clinically, and laboratory animals show it clearly. Calcium balance and a safeguarding of its ionization deserves our clinical scrutiny.

A recovery may well take place after much lower readings of CO_2 plasma combining power in diabetic acidosis. The reason for this lies in the fact that the alkaline bases are conserved; that we have insulin, which completes the breakup of the fatty acids, and that we have all this occurring close to the body cells themselves. We need rarely resort to the direct use of alkali, unless the plasma bicarbonate is too slowly replenished. Ordinarily the oxidation of the

ketone bodies releases the base tied to the ketone acids. In the acidosis of diarrheal dehydration they are lost, and the maintenance of equilibrium becomes very difficult. We may thus state with Marriott³ that the "underlying factors" are all-important and that we must be alert to the treatment of "symptoms" as they arise, with less attention to the disease entity creating them. Thus will better emergency therapeutics arise.

(b) Primary Carcinoma arising in the Upper Bronchus of the Right Lung; Metastases to the other lung, the spleen, liver, kidneys, and adrenals.

Mrs. P. S., aged 51, married, was the mother of four children. Three are living and well; the fourth died at 23 of a long-drawn-out pulmonary tuberculosis. The mother was closely in touch, nursing and caring for this daughter, over a period of two and one-half years. (This is important, due to the doubtful diagnostic pulmonary situation that arose with the mother during her illness.)

Her previous health had always been good. She was in the menopause, and had had some excessive flowing; she was inclined to be somewhat obese. A thorough examination two years previous to the onset of this illness failed to disclose any abnormality.

Her illness developed in March, 1928. It consisted chiefly of a distress in the chest, some cough, rather scanty sputum, and a very moderate dyspnea.

A careful roentgen examination in April, 1928, yielded no positive evidence, but there was a suggestion of increased shadows merging into the right hilus. It was not definite enough, however, from which to draw any conclusions. She showed no systemic evidence of weakness, undernutrition or toxemia.

She was then studied by my associate, Dr. P. G. Boman, about the middle of August, 1928. For one month she had had sharp shooting pains, radiating upward, in her right chest, toward the right scapula; her dyspnea had not materially increased; there was a slight elevation of temperature (99.4), and the leukocyte count was 11,200. There were no notable auscultatory lung findings, but there was definite dullness in the region of the base of the right lung. Three sputum specimens showed no tubercle bacilli.

On fluoroscopy, however, Dr. P. G. Boman noted "a fixation of the right diaphragm, with paradoxical movement of the diaphragm in respiration." Thus we had right-sided phrenic paralysis. At the same time, there was noted a small shadow near the upper portion of the right hilus. Quite important, and bearing upon the diagnosis, was a shadow of increasing lung density above the suggestive extrahilus shadow: this suggested and was charted as "compression atelectasis," or a shutting off of air in part from the right upper lobe.

A presumptive diagnosis was made of a primary carcinoma of the lung. Studies were made at the Mayo Clinic in September, 1928. Correspondence with the Mayo Clinic brought some data elicited from examination there. They reported the suggestive shadows mentioned above and stated that they had "the characteristics of either abscess or malignancy—physically

²Normal saline intravenous may actually increase the acidosis by displacing bicarbonate, some of which is voided in the urine.

³Marriott, McKim, and Hartman, Alexis F., "Newer Aspects of Acidosis," *Jour. Am. Med. Assn.*, Vol. 19, No. 22, Dec. 1, 1928, pp. 1675-79.

the examination of the chest seemed quite negative." She was examined with the bronchoscope at the Mayo Clinic in late September, 1928, and at that time it was stated that "there was a little edema and congestion of the mucous membrane at the opening of the right upper lobe bronchus." A little biopsied material apparently showed no evidence of malignancy.

Frequent examinations were made of the patient between Oct. 24, 1928, and the date of her death (Jan. 12, 1929), at St. Mary's hospital, Duluth. Suffice it to state briefly that in the interim she had two instances of moderate hemoptysis; that she developed increasing pain, and a rapidly enlarging shadow of increased roentgen density pushing upward and backward from the upper portion of the right lung hilus. The best appreciation of the growth was gained through laterally taken films.

Among other interesting studies made were a considerable series of studies of the polymorphonuclear leukocytes, according to the technic of Dr. C. H. Watkins and Prof. Hal Downey of the University of Minnesota. Her hemoglobin went down to 50 per cent, but the red blood cells were normal in appearance and slightly less than 4,000,000. The leukocyte count never advanced materially. While the polymorphonuclears showed some "bizarre forms," the smears studied on two occasions by Dr. Watkins did not show the typical lobulation, hooking, hair formation, etc., so carefully reported by Dr. Watkins, and thought to be characteristic of malignancy, and not uncommonly found in primary bronchus cancer.

The specimens and the microscopic slides thereof indicated a gelatinous type of well margined carcinoma, globular in form, and about four and one-half inches in diameter, growing upward directly from the right upper lobe bronchus. This, no doubt, explains the failure to see it through the bronchoscope. Dr. P. P. Vinson, of the Mayo Clinic, in a personal communication, states, "Of one hundred and eighty patients whom we bronchosoped last year, we were able to prove microscopically the presence of primary carcinoma in eighteen, and there were probably as many others who, like your patient, had lesions very suggestive of carcinoma, where positive tissue could not be obtained. The very marked increase of primary bronchial carcinoma is certainly alarming."

There were obvious metastases to the other lung, a very notable degree of metastases to the adrenals; extremely fine metastases in the lungs, the liver, kidneys and other organs.

In summary, it is well to draw attention to the insidious onset; to the dramatic interference with the right diaphragm; to the position which made biopsy through the bronchoscope impossible; to the early raising of material, mucoid in character, which might, in a measure, be associated with the type of cancer found at autopsy. It is well to emphasize the relative frequency of primary bronchus carcinoma, and to note the features of pulmonary tuberculosis which it copies; to keep in mind, however, that a high degree of pain is rarely found in tuberculosis apart from pleuritic distress. Frequently the roentgen studies are of the greatest aid early in the disease; later they are often confused greatly by complications. In this instance the complication of pressure atelectasis aided us; often the appearance of secondary purulent or non-purulent effusions totally mask the primary disease.

DR. F. J. HIRSCHBOECK (Duluth) read a paper on "Spontaneous Pneumothorax, with illustrative cases." Lantern slides were shown.

DISCUSSION

DR. A. T. MANN (Minneapolis): I would make just one suggestion, i.e., in cases where you want to make drainage for a short time only, that you use a Mozingo tube because you can keep sepsis farther away from the chest wall.

As the result of the formal ballot, the following men were elected to membership in the Academy:

University: Dr. J. C. McKinley.

Minneapolis: Dr. R. T. LaVake, Dr. Horace Newhart, Dr. T. A. Peppard, Dr. F. C. Rodda, Dr. C. N. Spratt.

St. Paul: Dr. F. E. Foley, Dr. E. K. Geer, Dr. E. V. Goltz, Dr. W. H. Hengstler, Dr. A. G. Schulze, Dr. Alex Stewart.

The meeting adjourned.

CARL B. DRAKE, M.D.,
Secretary.

PROGRESS

Abstracts to be submitted to Section Supervisors.

Members are urged to abstract valuable articles which they run across in their reading and send the abstracts to the physicians in charge of the respective sections. In order to avoid duplication it would be well to communicate with one of the section supervisors before the article is abstracted.

PEDIATRICS

SUPERVISORS:

CHESTER A. STEWART,
LA SALLE BLDG., MINNEAPOLIS

ROY N. ANDREWS,
MANKATO CLINIC, MANKATO

PROLAPSE OF THE RECTUM IN CHILDREN:

John J. Corbett, M.D. (Surgery, Gynecology and Obstetrics, February, 1929, Vol. xlviii, p. 280). Prolapse of the rectum is generally accepted as a descent, with or without protrusion, of one or all of the coats of the rectum. A prolapse may be of any size from that of a walnut to that of an orange, and not infrequently protrudes 3 to 4 inches.

The first consideration in the treatment of prolapse in children is to maintain the organ in its natural position, while the general constitutional condition and muscular tone are being restored to normal. If the prolapsed tissues have been exposed for a considerable time, there may be swelling and edema. Gradual and continued pressure with hot compresses may frequently give comfort and at the same time reduce the mass. An easy method of reduction is to cover the finger with a piece of toilet paper, introducing it into the lumen of the mass, forcing the finger carefully into the rectum, immediately withdrawing. The dry paper adheres to the mucous membrane, and releases the finger. The child should be kept upon its face for a short time thereafter.

Broad strips of adhesive passed anteriorly to anus and from one trochanter to the other so that they do not interfere with defecation will serve well for temporary support.

To prevent the occurrence of prolapse during bowel movement, the child should be required to defecate in the dorsal position into pads of cotton. It is important to keep the stools soft and the rectum lubricated. This is best accomplished by the administration of mineral oil.

Linear cauterization has been used sporadically by different men in different parts of the world. Cauterization sets up an inflammatory reaction in the submucous tissues directly beneath the line of application. In the organization of these inflammatory areas, there

is a development of fibrous tissue which firmly binds all coats of the rectal wall to its surrounding structures.

Four linear longitudinal incisions with a cautery are made through the mucous membrane extending up to but not into the anal canal. Care must be taken not to penetrate the rectal wall, especially anteriorly.

R. N. ANDREWS, M.D.

THE MONOCYTE IN ACTIVE TUBERCULOSIS: Kenneth D. Blackfan, M.D., and L. K. Diamond, M.D. (Amer. Jour. of Dis. of Children, February, 1929, Vol. xxxvii, 37, p. 233). The degree of activity in tuberculosis is reflected in the peripheral blood of infants and of children.

A high monocyte-lymphocyte ratio and the presence of epithelioid cells usually mean an active tuberculous infection.

An increasing monocyte-lymphocyte ratio and the persistence of a high absolute monocyte count signify extension of the process.

Reversal of the ratio (a fall in monocytes and an increase in lymphocytes) denotes healing lesions.

In cases in which the diagnosis is questionable, a study of the blood by the supravital technic may lead to a correct diagnosis.

When the diagnosis is established, supravital studies of the blood may be of prognostic value in indicating whether the lesion is progressing or undergoing regression.

R. N. ANDREWS, M.D.

THE TANNIC ACID TREATMENT OF BURNS

IN CHILDREN: Albert H. Montgomery, M.D. (Surgery, Gynecology and Obstetrics, February, 1929, Vol. xlviii, p. 277). The importance of having a satisfactory treatment for burns is at once apparent when we recognize the high mortality and the prolonged and deforming morbidity that accompany this group of injuries.

The treatment must aim (1) to stop pain, (2) to prevent toxemia, (3) to insure asepsis, (4) to prevent the loss of tissue fluids, and (5) to prevent contractures and scar formation. All methods make use of the same systemic treatment. Briefly, this consists of morphine to relieve pain and shock, glucose and alkaline solutions to supply body fluids and combat toxemia. In the local treatment of burns the various methods employed fall essentially into these groups: The biochemical or alkaline treatment; the protective method or paraffine treatment; fixation methods. The principle on which this mode of treatment is based is that of healing a wound under a crust.

The use of tannic acid was introduced by Davison in 1925. After cleansing, a 5 per cent solution of tannic acid is sprayed over the wound. This solution should be freshly prepared as it turns to gallic acid on standing. Without clothes or dressings of any kind, the child is placed in bed on a sterile sheet. Any necessary splints or suspension apparatus for the limbs are then applied. Blankets are placed to form a tent over

the bed with one or two electric lights suspended from the roof for warmth and drying purposes. Fluids are forced by mouth or given by hypodermoclysis or proctoclysis. Every half hour the wound area is sprayed with the tannic acid solution but no dressings are applied. In from 15 to 24 hours a dry brown crust, smooth like a piece of leather, has formed over the wound. At the end of 3 or 4 days, all evidences of toxemia usually disappear. In the deeper burns the crust usually loosens in from 2 to 3 weeks, leaving a clean granulating surface. It has been found that if wet dressings of boric acid are used, a rapid toxemia arises that is frequently fatal.

R. N. ANDREWS, M.D.

EYE, EAR, NOSE AND THROAT

SUPERVISORS:

VIRGIL J. SCHWARTZ,
PHYS. & SURG. BLDG., MINNEAPOLIS

ARTHUR C. DEAN
CROOKSTON CLINIC, CROOKSTON

THE INCIDENCE OF NASAL SINUSITIS WITH DISEASES OF THE EAR: E. P. Fowler, M.D., New York (Otolaryngology, Feb., 1929, IX, 2, 159). This article gives an analysis of 100 cases divided into five groups: five cases nonsuppurative otitis media, thirty-seven of healed suppurative otitis media, thirty-four of recurrent suppurative otitis media, thirteen of chronic suppurative otitis media and eleven of nerve deafness.

The sinuses were diseased in 84 per cent of these cases, and the ethmoid and maxillary sinuses showed evidence of disease. The ethmoids were involved di-

rectly as the chronicity of the inflammation of the ear and the antra indicated much more in recurrent and chronic suppuration of the ear than in healed suppurations. In the healed cases condensing osteitis was not demonstrable, whereas in the recurrent cases it was 12 per cent and in chronically running ears 8 per cent.

The presence of condensing osteitis indicates long or recurrent obliterating pathologic changes. Absorption occurred in 27 per cent of the healed cases, in 18 per cent of the recurrent and in 8 per cent of chronic suppurations of ear. Edema occurred in 51 per cent of the healed cases and in only 38 per cent of the recurrent and chronic cases. Absorption and edema occurred in inverse ratio to the chronicity of the ear discharge. Edema is dangerous. It may at any time light up a local sinusitis or a pansinusitis involving the middle ear in infection and endangering the inner ear or nerve through infection or toxemia.

In the healed cases there is the smallest percentage of involvement of the ethmoids and maxillary sinuses and the largest amount of absorption and edema. If the sinusitis clears up, leaving infection in the ear spaces, the ears may become a menace to the sinuses, thus establishing a vicious circle within the spaces in the ear and nose.

Except for sixteen cases every involvement of the ethmoids and antra in those children was in some degree concurrent, and all but one or two cases were bilateral, except the cases of healed suppurations, of which 50 per cent were unilateral.

In studying the controls it was found that hearing may be an average normal in both ears, when the sinuses show distinct and sometimes marked pathologic changes, but that in such cases history and signs of past suppuration in the ear are present. Of 775 children tested by the audiometer, 361 who showed average normal hearing gave past histories of otitis media.

ARTHUR C. DEAN, M.D., F.A.C.S.

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS EXAMINATION REPORT, JANUARY, 1929

BY EXAMINATION

NAME	SCHOOL AND DATE OF GRADUATION	ADDRESS
Briggs, John Francis	U. of Minn., M.B., 1928	862 E. 4th St., St. Paul.
Butzin, Ted Arzt	U. of Minn., M.B. and M.D., 1928	770 E. 4th St., St. Paul.
Canfield, Wayne W.	U. of Minn., M.B., 1928	University Hospital, Minneapolis.
Cook, Edward Noble	U. of Minn., M.B., 1928	889 Lincoln Ave., St. Paul.
Engel, Edward Ewald	U. of Minn., M.B., 1928	1097 22nd Ave. S. E., Minneapolis.
Evans, Robert David	U. of Minn., M.B. and M.D., 1928	1995 Sheridan Ave. S., Minneapolis.
Greeley, Horace, Jr.	Cornell, M.D., 1927	Mayo Clinic, Rochester.
Hegge, Rolv S.	U. of Minn., M.B., 1928	St. Mary's Hospital, Duluth, Minn.
Hetzler, Arnold E.	U. of Minn., M.B., 1928	University Hospital, Minneapolis.
Hubbard, Otto Emil	U. of Minn., M.B., 1928	St. Mary's Hospital, Duluth, Minn.
Hubin, Edwin G.	U. of Minn., M.B., 1928	Ancker Hospital, St. Paul.
Johnson, Detlof Emmanuel	U. of Minn., M.B., 1928	642 Park Drive, St. Paul.
Juergs, Edward H.	U. of Louisville, M.D., 1928	Miller Hospital, St. Paul.
Kotchevar, Frank Ralph	Northwestern, M.D., 1928	Eveleth, Minn.
Lenz, Otto Anton	U. of Minn., M.B., 1928	General Hospital, Minneapolis.
Levins, Ida	U. of Minn., M.B., 1928	412 Walnut St. S. E., Minneapolis.
Light, Frank Phenecie	U. of Minn., M.B., 1928	4224 Linden Hills Blvd., Minneapolis.
Major, S. Glenn	Harvard, M.D., 1927	Ancker Hospital, St. Paul.
Manson, Melville Husted	U. of Minn. M.B., 1927; M.D., 1928	500 Harvard S. E., Apt. 18, Minneapolis.
Rusten, Elmer M.	U. of Minn., M.B., 1928	329 Union St. S. E., Minneapolis.
Stevens, Robert Bruce	Wash. U., St. Louis, Mo., M.D., 1927	Mayo Clinic, Rochester, Minnesota.
Strauch, Clauss Burkart	Georg-August U. of Gottingen, Germany, Dr. of Med., 1922	McGregor, Minn.
Verbrugghen, Adrien H. P. E.	U. of Sydney, M.B., 1922	419½ 4th St. S. W., Rochester, Minn.
Ziegler, Newell Richard	U. of Minn., M.B. and M.D., 1928	212 Walnut St. S. E., Minneapolis.

BY RECIPROCITY

Dawson, Emerson Blanton	U. of Iowa, M.D., 1926	Miller Clinic, Hamm Bldg., St. Paul.
Doering, Raymond Edmund	St. Louis Univ., M.D., 1924	732 8th Ave. So., Minneapolis.
Fasting, George F. C.	Rush, M.D., 1926	Mayo Clinic, Rochester, Minn.
Keller, George Frederick	Loyola, M.D., 1928	412 N. 2nd St., Mankato, Minn.
Kintner, Arthur Ruel	U. of Nebr., M.D., 1925	Mayo Clinic, Rochester, Minn.

NATIONAL BOARD CANDIDATE

Stewart, Colin Campbell, Jr.	U. of Pennsylvania, M.D., 1926	Mayo Clinic, Rochester, Minn.
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WANTED: PHYSICIAN

Practicing, to take an ethical interest, without investment, in a high class therapeutic product of merit. Will not interfere with daily practice. If sincerely interested, address D-16, care MINNESOTA MEDICINE.

LABORATORY TECHNICIAN desires position in Northwest. Will graduate from Dr. R. B. H. Gradwohl's School of Laboratory Technique, St. Louis, Missouri, April first. Besides routine laboratory work can do X-ray and basal metabolism. Address D-4, care MINNESOTA MEDICINE.

FOR SALE—A \$9,000 general practice in city of 3,000 in southern Minnesota. Good opportunity to make money from start. Ideal living conditions. Equipment complete with X-ray, diathermy, quartz light, etc. Going on fellowship April 1. Address D-3, care MINNESOTA MEDICINE.

WANTED—Locum tenens two to six months. One year general internship. Am completing year's surgical residency charity hospital. Available July 1. References. Address D-15, care MINNESOTA MEDICINE.

LOCUM TENENS, licensed in Minnesota, for period of 6 to 8 weeks to begin June 1. Address D-11, care MINNESOTA MEDICINE.

WANTED—Salaried appointments for Class A Physicians in all branches of the medical profession. Let us put you in touch with the best man for your opening. Our nation-wide connections enable us to give superior service. Aznoe's National Physicians' Exchange, 30 North Michigan Ave., Chicago. Established 1896. Member The Chicago Association of Commerce.

BETHANY HOSPITAL, 3701 Bryant Avenue South, Minneapolis, is equipped to care for limited number of maternity cases at a nominal fee. New building. Light, airy rooms. Good food. Call Colfax 0016 or in person at above address.

TECHNICIAN experienced in Diathermy—Morse Wave Light treatments, wants position as technician or doctor's assistant. Experienced in typing and office work. Address D-14, care MINNESOTA MEDICINE.

OPPORTUNITY FOR PHYSICIAN AND SURGEON. X-ray work. For information address S. E. Bennion, Hutchinson, Minn.

FOR RENT—Physician's and Surgeon's Offices, 3807 Nicollet Ave. Waiting room in common with established dentist. Rent very reasonable to right party. Call Main 4602, Minneapolis.